

# Plant-applied external coatings for steel pipe



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# Preface

This is the first edition of the CSA Z245.20 Series, *Plant-applied external coatings for steel pipe*, which consists of the sixth edition of CSA Z245.20, *Plant-applied external fusion bond epoxy coating for steel pipe*, the fifth edition of CSA Z245.21, *Plant-applied external polyethylene coating for steel pipe*, and the first edition of CSA Z245.22, *Plant-applied external polyurethane foam insulation coating for steel pipe*. This edition of CSA Z245.20 supersedes the previous editions published in 2006, 2002, 1998, 1992, and 1986, and this edition of CSA Z245.21 supersedes the previous editions published in 2006, 2002, 1998, and 1992.

CSA Z245.20 deals with the requirements for plant-applied external fusion bond epoxy coating for steel pipe. The main differences from the previous edition are as follows:

- the definition of a working shift has been added;
- the definition of certificate of compliance has been revised;
- the definition of a glass transition temperature has been modified;
- the maximum interval between tests of epoxy powder and coating application has been specified;
- the requirements for preparation of laboratory-coated test specimens have been revised;
- the test requirements for coating qualifications have been revised;
- a requirement to measure the coating thickness over any raised weld has been added;
- the requirements for production test rings have been revised;
- the test procedures have been reformatted;
- the measurement of the density of the epoxy powder has been made mandatory;
- the test procedures for determining the thermal characteristics of the epoxy powder and coating have been revised (also see [Figures 3, 4, and 5](#));
- the test procedures for cathodic disbondment of the coatings have been revised;
- [Table 2](#) — criteria for evaluating degree of coating cure has been revised;
- [Table 2](#) — adhesion tests for System 1B have been revised;
- [Table 3](#) — criteria for evaluating degree of coating cure has been revised;
- [Table 4](#) — criteria for evaluating degree of coating cure has been revised;
- [Table 6](#) — requirements for cathodic disbondment tests have been removed;
- [Table 6](#) — requirements for adhesion tests have been removed;
- [Table 7](#) — criteria for evaluating degree of coating cure has been revised;
- [Table 8](#) — criteria for evaluating degree of coating cure has been revised; and
- [Figures 4 and 5](#) — examples of thermal scans for epoxy powders and cured coatings have been revised.

CSA Z245.21 deals with the requirements for plant-applied external polyethylene coating for steel pipe. The main differences from the previous edition are as follows:

- the definition of a working shift has been added;
- the definition of certificate of compliance has been revised;
- the definition of primer lot has been changed to primer batch;
- the maximum interval between tests of materials and coating application has been specified;
- the requirements for coating requalification by the applicator have been modified;
- the surface preparation requirements for System B2 have been modified;
- for incoming raw materials, requirements for gel time tests have been added;
- the requirements for production test rings have been revised;
- the requirements for placement of required markings have been modified; and
- the test procedures have been reformatted.

These Standards were prepared by the Task Force on Pipeline Insulation Coatings, the Subcommittee on Coatings, and the Subcommittee on Materials, under the jurisdiction of the Technical Committee on Petroleum and Natural Gas Industry Pipeline Systems and Materials and the Strategic Steering Committee on Petroleum and Natural Gas Industry Systems, and have been formally approved by the Technical Committee.

May 2010

**Notes:**

- (1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
- (2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*
- (3) *This publication was developed by consensus, which is defined by CSA Policy governing standardization — Code of good practice for standardization as “substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity”. It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this publication.*
- (4) *CSA Standards are subject to periodic review, and suggestions for their improvement will be referred to the appropriate committee.*
- (5) *All enquiries regarding this Standard, including requests for interpretation, should be addressed to Canadian Standards Association, 5060 Spectrum Way, Suite 100, Mississauga, Ontario, Canada L4W 5N6.  
Requests for interpretation should
  - (a) *define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;*
  - (b) *provide an explanation of circumstances surrounding the actual field condition; and*
  - (c) *be phrased where possible to permit a specific “yes” or “no” answer.*Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization and are published in CSA’s periodical Info Update, which is available on the CSA Web site at [www.csa.ca](http://www.csa.ca).*

*CSA Standard*

*Z245.20-10*

***Plant-applied external fusion bond epoxy  
coating for steel pipe***



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# Z245.20-10

## ***Plant-applied external fusion bond epoxy coating for steel pipe***

### **1 Scope**

#### **1.1**

This Standard covers the qualification, application, inspection, testing, handling, and storage of materials required for plant-applied fusion bond epoxy (FBE) coating applied externally to bare steel pipe. The coated pipe is intended primarily for buried or submerged service for oil or gas pipeline systems.

#### **1.2**

This Standard covers the following coating systems:

- (a) System 1A: single-layer FBE with a glass transition temperature of 110 °C or less;
- (b) System 1B: single-layer FBE with a glass transition temperature greater than 110 °C;
- (c) System 2A: two-layer FBE with an anti-corrosion coating and a protective overcoat;
- (d) System 2B: two-layer FBE with an anti-corrosion coating and an abrasion-resistant overcoat;
- (e) System 2C: two-layer FBE with an anti-corrosion coating and an anti-slip overcoat; and
- (f) System 3: three-layer FBE with an anti-slip overcoat applied over an anti-corrosion coating and a protective overcoat.

#### **1.3**

In CSA Standards, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “should” is used to express a recommendation or that which is advised but not required, and “may” is used to express an option or that which is permissible within the limits of the standard.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

### **2 Reference publications**

This Standard refers to the following publications, and where such reference is made, it shall be to the editions listed below, unless the user finds it more appropriate to use newer or amended editions of such publications.

#### **CSA (Canadian Standards Association)**

CAN/CSA-ISO 9001-08

*Quality management systems — Requirements*

Z662-07

*Oil and gas pipeline systems*