PROCESS INDUSTRY PRACTICES

TECHNICAL REVISION
June 2021

Coatings

PIP CTSE1000
Application of External Coatings

PURPOSE AND USE OF PROCESS INDUSTRY PRACTICES

In an effort to minimize the cost of process industry facilities, this Practice has been prepared from the technical requirements in the existing standards of major industrial users, contractors, or standards organizations. By harmonizing these technical requirements into a single set of Practices, administrative, application, and engineering costs to both the purchaser and the manufacturer should be reduced. While this Practice is expected to incorporate the majority of requirements of most users, individual applications may involve requirements that will be appended to and take precedence over this Practice. Determinations concerning fitness for purpose and particular matters or application of the Practice to particular project or engineering situations should not be made solely on information contained in these materials. The use of trade names from time to time should not be viewed as an expression of preference but rather recognized as normal usage in the trade. Other brands having the same specifications are equally correct and may be substituted for those named. All Practices or guidelines are intended to be consistent with applicable laws and regulations including OSHA requirements. To the extent these Practices or guidelines should conflict with OSHA or other applicable laws or regulations, such laws or regulations must be followed. Consult an appropriate professional before applying or acting on any material contained in or suggested by the Practice.

This Practice is subject to revision at any time.

PRINTING HISTORY

April 1999	*Issued*	*February 2006*	*Editorial Revision*	*October 2018*	*Reaffirmation with Editorial Revision*
February 2005	*Complete Revision*	*June 2007*	*Editorial Revision*	*June 2019*	*Technical Correction*
July 2005	*Technical Correction*	*December 2012*	*Reaffirmation with Editorial Revision*	*June 2021*	*Technical Revision*

Not printed with State funds

PROCESS INDUSTRY PRACTICES

TECHNICAL REVISION
June 2021

Coatings

PIP CTSE1000
Application of External Coatings

Table of Contents

Data Forms

CTSE1000-D001 – Documentation Requirements Sheet

The following data forms shall be part of this Practice only if indicated on the purchaser's completed Documentation Requirements Sheet.

CTSE1000-D002 – Color Selection Sheet

CTSE1000-D101 – External Coating Systems, Coating System No. 1, Inorganic Zinc IZ

CTSE1000-D102 – External Coating Systems, Coating System No. 2, Inorganic Zinc/Epoxy Polyamide IZ/EC

CTSE1000-D103 – External Coating Systems, Coating System No. 3, Epoxy Polyamide (3 Coats) EC/EC/EC

CTSE1000-D104 – External Coating Systems, Coating System No. 4, Epoxy Phenolic EP

CTSE1000-D105 – External Coating Systems, Coating System No. 5, Epoxy Phenolic (3 Coats) EP/EP/EP

CTSE1000-D106 – External Coating Systems, Coating System No. 6, Epoxy Polyamide/Urethane EC/UR

CTSE1000-D107 – External Coating Systems, Coating System No. 7, Coal Tar Epoxy (2 Coats) TE/TE

CTSE1000-D108 – External Coating Systems, Coating System No. 8, Inorganic Zinc/Water-Borne Acrylic IZ/WA

CTSE1000-D109 – External Coating Systems, Coating System No. 9, Alkyd (3 Coats) OA/OA/OA

CTSE1000-D110 – External Coating Systems, Coating System No. 10, Inorganic Zinc/Silicone Acrylic (2 Coats) IZ/SA/SA

CTSE1000-D111 – External Coating Systems, Coating System No. 11, Silicone for Stainless Steel (2 Coats) SS/SS

CTSE1000-D112 – External Coating Systems, Coating System No. 12, Heat-Cured Silicone (2 Coats) HS/HS

CTSE1000-D113 – External Coating Systems, Coating System No. 13, Epoxy Mastic for Manufacturer's Standard EM

CTSE1000-D114 – External Coating Systems, Coating System No. 14, Inorganic Zinc/Heat-Cured Silicone (2 Coats) IZ/HS/HS

CTSE1000-D115 – External Coating Systems, Coating System No. 15, Inorganic Zinc/Epoxy Mastic/Urethane IZ/EM/UR

CTSE1000-D116 – External Coating Systems, Coating System No. 16, Low Temperature Curing Epoxy (2 Coats) EL/EL

CTSE1000-D117 – External Coating Systems, Coating System No. 17, Polysiloxane (2 Coats) PX/PX

CTSE1000-D118 – External Coating Systems, Coating System No. 18, Epoxy Mastic (2 Coats)/Urethane EM/EM/UR

CTSE1000-D119 – External Coating Systems, Coating System No. 19, Epoxy Novolac (2 Coats) EN/EN

CTSE1000-D120 – External Coating Systems, Coating System No. 20, Epoxy Phenolic (2 Coats) EP/EP

CTSE1000-D121 – External Coating Systems, Coating System No. 21, Organic Zinc/Urethane OZ/UR

CTSE1000-D122 – External Coating Systems, Coating System No. 22, Epoxy Mastic/Water-Borne Acrylic EM/WA

CTSE1000-D123 – External Coating Systems, Coating System No. 23, Epoxy Mastic/Epoxy Polyamide EM/EC

CTSE1000-D124 – External Coating Systems, Coating System No. 24, Epoxy Mastic/Urethane EM/UR

CTSE1000-D125 – External Coating Systems, Coating System No. 25, High Build Epoxy (2 Coats)/Urethane EH/EH/UR

CTSE1000-D126 – External Coating Systems, Coating System No. 26, Coal Tar Epoxy (1 Coat) TE

CTSE1000-D127 – External Coating Systems, Coating System No. 27, Thermal Spray Aluminum - Aluminum TSA

CTSE1000-D128 – User-Defined Coating Systems

CTSE1000-D129 – External Coating Systems, Coating System No. 29, Epoxy Novolac EN

CTSE1000-D130 – External Coating Systems, Coating System No. 30, Inorganic Copolymer (2 Coats) IC/IC

CTSE1000-D131 – External Coating Systems, Coating System No. 31, Hot Dip Galvanizing

CTSE1000-D132 – External Coating Systems, Coating System No. 32, Cold Galvanizing

CTSE1000-D133 – External Coating Systems, Coating System No. 33, Organic Zinc/Epoxy Mastic/Urethane OZ/EM/UR

CTSE1000-F – Daily Inspection Report

1. Scope

This Practice describes the general requirements for surface preparation, application, and inspection of protective coatings.

2. References

Applicable parts of the following industry codes and standards and references shall be considered an integral part of this Practice. The edition in effect on the date of contract award shall be used, except as otherwise noted. Short titles will be used herein where appropriate.

2.1 Industry Codes and Standards

- American Society for Testing and Materials (ASTM)
  - ASTM D3359 – *Standard Test Methods for Rating Adhesion by Tape Test*
  - ASTM D4285 – *Standard Test Methods for Indicating Oil or Water in Compressed Air*
  - ASTM D4417 – *Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel*
  - ASTM D4541 – *Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers*
  - ASTM E337 – *Standard Test Method for Measuring Humidity with a Psychrometer (the Measurement of Wet- and Dry-Bulb Temperatures)*
- International Organization for Standardization (ISO)
  - ISO 2178 –*Non-magnetic coatings on magnetic substrates - Measurement of coating thickness - Magnetic method*
  - ISO 2360 –*Non-conductive coatings on non-magnetic electrically conductive base metals - Measurement of coating thickness - Amplitude-sensitive eddy current method*
  - ISO 2409 – *Paints and varnishes - Cross-cut test*
  - ISO 4624 – *Paints and varnishes - Pull-off test for adhesion*
  - ISO 4677-2 – *Atmospheres for conditioning and testing - Determination of relative humidity - Part 2: Whirling psychrometer method*
  - ISO 8501-1 – *Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness - Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings*
  - ISO 8502-9 – *Preparation of steel substrates before application of paints and related products - Tests for the assessment of surface cleanliness - Part 9: Field method for the conductometric determination of water-soluble salts*
  - ISO 8503-5 – *Preparation of steel substrates before application of paints and related products - Surface roughness characteristics of blast-cleaned steel substrates - Part 5: Replica tape method for the determination of the surface profile*
  - ISO 8504-2 – *Preparation of steel substrates before application of paints and related products - Surface preparation methods - Part 2: Abrasive blast-cleaning*