# ATPT-2818: SPECIAL TOPICS IN COATINGS INSPECTOR II

## Cuyahoga Community College

### Viewing: ATPT-2818 : Special Topics in Coatings Inspector II

**Academic Term:**
Fall 2026

**Subject Code**
ATPT - Appld Indus Tech - Painting

**Course Number:**
2818

**Title:**
Special Topics in Coatings Inspector II

**Catalog Description:**
A certification course for the industrial painting industry covering all aspects of metal coatings including causes of substrate deterioration, coatings tests and equipment and immersion linings. Included are preparations requirements for applications covering high pressure washing and acid edging and safety regulations for application and product transport.

**Credit Hour(s):**
5

**Lecture Hour(s):**
5

### Requisites

**Prerequisite and Corequisite**
Departmental approval: admission to Painter's apprenticeship program.

### Outcomes

**Course Outcome(s):**
Discuss the electrochemical process, including the chemical, mechanical, and environmental effects and controls of substrate decay, including testing instrumentation.

**Objective(s):**
1. List and define the terms related to corrosion.
2. Identify the four parts of the corrosion cell and explain the function of each.
3. Explain the interaction of the corrosion cell parts with each other to cause material decay.
4. Explain the biological, chemical, and mechanical effects related to corrosion.
5. Discuss the effects of environmental conditions, including dew point and humidity, and ambient air temperature.
6. Discuss the environmental controls, including the air exchanger and dehumidifier, within the containment.
7. Differentiate between environmental testing and advanced nondestructive testing instruments.

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**Course Outcome(s):**
Discuss the process of using centrifugal blast cleaning and water jetting for substrate preparation, including the application of the safety standards for equipment operation.

**Objective(s):**
1. List and define the terms related to centrifugal blasting and water jetting.
2. Explain the purpose of centrifugal blast cleaning and describe the equipment used.
3. List the different types of centrifugal machinery and describe the relative uses.
4. Identify the components of the centrifugal system and discuss the maintenance procedures resulting from the effects of part wear within the blast pattern.
5. List the advantages of using water jetting systems to expose existing profiles.

6. Describe the environment where water jetting is best suited.
7. Identify the different types of water jetting equipment and explain the levels of efficiency for cleaning substrate classification.
8. List the safety concerns related to water jetting systems and discuss the special personal protective equipment PPE required for worker protection.

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**Course Outcome(s):**

Discuss the different types of tests and test equipment used in non-destructive testing for coatings applications on various non-metallic substrates, including concrete.

**Objective(s):**

1. List the different types of non-metallic substrates.
2. Identify the different non-destructive tests used for non-metallic substrates
3. Explain the various procedures used for coatings application tests as prescribed by the respective standards.
4. Reference the applicable standards with respect to the coatings application tests.
5. Discuss the importance of concrete testing for coatings before application and explain the consequences of product failure with respect to specific tests.
6. Identify the different types of mechanical, digital, and ultrasonic equipment used for moisture detection, soluble salts, calcium chloride, and coatings thickness.

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**Course Outcome(s):**

Describe the different types and purposes of immersion linings and the application processes and specialized application equipment required.

**Objective(s):**

1. Identify and define the terms used with respect to immersion linings.
2. Differentiate between natural and synthetic rubberized linings.
3. State the purpose of immersion linings.
4. Describe the uses of immersion linings and explain the individuality of each.
5. Describe the process of applying immersion linings on different substrates.
6. List the different types of specialized application equipment and describe the operation of each**.**

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**Course Outcome(s):**

Describe the preparation procedures used for concrete coatings, including high-pressure washing and acid etching, the concrete process and effects, and the resolution of problems due to improper concrete placement.

**Objective(s):**

1. List and define the terms used with concrete preparation.
2. Identify the procedures used for preparing concrete for coating application.
3. Differentiate between high-pressure washing and acid etching.
4. Explain the concrete process, including ingredients, mixtures, and curing.
5. Identify the problems resulting from improper concrete placement.
6. Discuss various resolutions to problems resulting from latency and efflorescence segregation.
7. Discuss core drilling samples for identifying concrete placement problems.

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**Course Outcome(s):**

Discuss the properties and applications of pipelines and mainlines used to transport products and describe the effects of the environment on the pipe, the coatings, and linings used, and required adhesion testing procedures.

**Objective(s):**

1. List and define the terms used with respect to pipeline and adhesion testing.
2. Identify the different types of pipe and describe the specific use of each
3. Discuss the different types of pipe lining and describe their respective uses.
4. Explain the environmental effects on pipeline coatings.

5. List and explain the different types of non-destructive and destructive tests used on pipe exterior coatings.
6. Discuss the field preparations required for field joint repair.
7. Assess the respective destructive test and repair or remediate as required.

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**Methods of Evaluation:**

1. Assignments
2. Reading
3. Participation
4. Attendance
5. Exams

**Course Content Outline:**

1. **Corrosion, controls and testing**
    a. **Terminology**
        i. **Substrate decay**
        ii. **Environment**
        iii. **Containment**
        iv. **Dew point**
        v. **Humidity**
        vi. **Ambien temperature**
        vii. **Substrate profile**
        viii. **Air exchanger**
        ix. **Opposing surfaces**
        x. **Positecor**
        xi. **Sling psychometric**
        xii. **Pathway**
        xiii. **Cathode**
        xiv. **Anode**
        xv. **Electrolyte**
        xvi. **Impressed current system**
    b. **Corrosion cell**
        i. **Parts**
            1. **Anode**
            2. **Cathode**
            3. **Return path**
            4. **Electrolyte**
        ii. **Inner action**
        iii. **Pathway**
    c. **Cell parts interaction**
        i. **Electron ion**
        ii. **Cathode to ion**
        iii. **Ohm's law**
2. **Effects**
    a. **Biochemical**
        i. **Opposing metals**
        ii. **Opposing coatings**
        iii. **Mold**
        iv. **Localized corrosion**
    b. **Mechanical**
        i. **Opposing metals**
        ii. **Vibration**
        iii. **Friction**
        iv. **Oscillation**
        v. **Disbanding**
3. **Environmental conditions**

a. **Humidity**
b. **Temperature**
    i. **Atmospheric**
    ii. **Substrate**
c. **Dew point**
d. **Barometric pressure**
e. **Wind**

1. **Environmental controls**
    a. **Dehumidifier**
        i. **Desiccant**
        ii. **Refrigerant**
    b. **Air exchanger**
        i. **Rating**
        ii. **Area volume**
        iii. **Exchange rate**
    c. **Containment**
        i. **Type**
            1. **Negative air**
            2. **Breathable**
        ii. **Hard side**
2. **Testing equipment**
    a. **Environment**
        i. **Ambient air**
        ii. **Atmospheric**
    b. **Nondestructive**
        i. **Substrate condition**
        ii. **Coatings quality**
    c. **Tests**
        i. **Adhesion**
        ii. **Thickness**
        iii. **Cure**
        iv. **Tensile strength**
        v. **Elasticity**

1. **Centrifugal blast cleaning and water jetting**
    a. **Terms**
        i. **Table**
        ii. **Visual cleanliness**
        iii. **Water jetting**
        iv. **Back thrust**
        v. **Flash rust**
        vi. **Robotics**
        vii. **Operator technique**
        viii. **Turtle skin**
        ix. **Stand-off distance**
        x. **Operator fatigue**
        xi. **Metatarsal guard**
        xii. **Impermeable**

1. **Centrifugal blast cleaning**
    a. **Purpose**
        i. **Mass cleaning of parts**
        ii. **Shop based operation**
    b. **Flat surface applications**
2. **Machinery types/uses**
    a. **Tumbling mill/small parts**
    b. **Multi-table/large parts**
    c. **Swing table/multiple parts**
    d. **Conveyor belt/flat steel**
    e. **Rack system/steel beams**
3. **Components**

a. **Abrasive separator**
b. **Hopper**
c. **Centrifugal wheel**
d. **Reclamation trough**
e. **Belt and bucket system**

4. **Maintenance procedures**
   a. **Sieve inspection**
   b. **Parts wear**
   c. **Feed tubes**
   d. **Conveyor systems**
   e. **Lubrication**
   f. **Storage hopper cleaning**
5. **Water jetting**
   a. **Advantages**
      i. **Air quality**
      ii. **PPE/respiratory**
      iii. **Dust free**
      iv. **Environmental friendly**
      v. **Cost efficient**
      vi. **Clean up**
   b. **Disadvantages**
      i. **No profile**
      ii. **Cost personal injury**
      iii. **Water reclamation requirements**
      iv. **Operator fatigue**

1. **Applications**
   a. **Marine environment**
   b. **Power plants**
      i. **Nuclear**
      ii. **Coal**
   c. **Process facilities**
      i. **Flour mills**
      ii. **Grain silos**
   d. **Equipment types/pounds per square inch (psi) efficiency**

**Low pressure/<5000 psi**

1. **High pressure/<10000 psi**
2. **High pressure water jetting/<30000 psi**
3. **Ultra high/over 90000 psi**
4. **Safety**
   a. **Concerns**
      i. **Electrocution**
      ii. **Hose rupture**
      iii. **Gun explosion**
      iv. **Injection**
      v. **Slips, trips, and falls**
   b. **Special PPE**
      i. **Turtle skin suit**
      ii. **Metatarsal boots**
      iii. **Hearing**
      iv. **Eye**
      v. **Respirator**

1. **Coatings applications: testing equipment and substrates**
   a. **Non-metallic substrates**
      i. **Concrete**
      ii. **Wood**
      iii. **Stucco**
      iv. **Aluminum**
      v. **Plastic**

   b. **Non-destructive tests**
      i. **Moisture**
      ii. **Calcium chloride**
      iii. **Surface profile**
   c. **Test procedures**

1. **Test applications**
   a. **American standard test methods (ASTM)-D 4263 plastic sheet**
   b. **ASTM-F 1869 calcium chloride**
   c. **ASSTM-F2170-02 relative humidity**
   d. **Profile putty/Top Concrete Profile (TCP)**
2. **Concrete tests**
   a. **Importance**
      i. **Moisture content**
      ii. **Surface salts**
      iii. **Foreign films**
         1. **Oil**
         2. **Grease**
         3. **Solvents**
   b. **Substrate strength**
   c. **Permeability**
   d. **Impingement**
3. **Ultrasonic test**
   a. **Calibration**
   b. **Frequency**
   c. **Parameters**
   d. **Accuracy**
   e. **Repeatability**

1. **Immersion linings: purpose and application**
   a. **Terminology**
      i. **Cementitons**
      ii. **Intumescent**
      iii. **Vulcanized rubber**
      iv. **Elostomeric**
      v. **Lining**
      vi. **Ablative coatings**
      vii. **Polyester**
      viii. **Epoxy**
      ix. **Self-smoothing**
      x. **Foul release**
      xi. **Impermeable**
      xii. **Anti-microbial**

1. **Rubberized lining**
   a. **Natural**
      i. **Flexibility**
      ii. **Broad protection**
   b. **Synthetic**
      i. **Specialty**
      ii. **Butyl**
      iii. **Nitrile**
      iv. **Neoprene**
      v. **Teflon**
2. **Purpose**
   a. **Friction reduction**
   b. **Anti- fouling**
   c. **Impermeable**
   d. **Chemical resistant**
3. **Uses**

a. **Pipeline**
b. **Cold storage tanks**
c. **Chemical resistant**
d. **Waste water**
e. **Railroad cars**
f. **Protective barriers**
g. **Nuclear reactive plant**

4. **Immersion linings and substrates**
   a. **Linings**
      i. **Concrete**
      ii. **Foam**
      iii. **Coal tar enamel**
      iv. **Liquid epoxy**
         1. **Macro epoxy 646**
         2. **Dura plate 245**
         3. **Ultra- high liquid**
      v. **Vulcanized rubber**
         1. **Ablative**
         2. **Non-ablative**
      vi. **Ceramic**
   b. **Substrate**
      i. **Stainless steel**
      ii. **Aluminum**
      iii. **Ductile iron**
      iv. **Polyethylene plastic piping**
5. **Specialize application equipment**
   a. **Type**
      i. **Hand tools**
      ii. **Air-less pump**
      iii. **Air assisted pump**
      iv. **Plural component pump**
      v. **Putz pump**
   b. **Operation**
      i. **Certification**
         1. **Coating application specialist**
         2. **Polyuria development association**
      ii. **Energy source**
         1. **Air**
         2. **Hydraulic**
         3. **Electrical**

1. **Concrete preparation, process, effect, and problem resolution**
   a. **Terminology**
      i. **Spacer**
      ii. **Mesh**
      iii. **Substrate flow**
      iv. **Substrate preparation**
      v. **Application**
      vi. **Cure**
      vii. **Acid edge**
      viii. **High pressure washing**
   b. **Concrete preparation procedures**
      i. **Testing**
         1. **Plastic sheet**
         2. **PH balance**
         3. **Alkalinity**
         4. **Moisture**
         5. **Methods**
            a. **International concrete repair institute**
            b. **American standard test method**

- c. **High pressure washing versus acid edging**
  - i. **High pressure washing**
    1. **Ultra- high pressure**
       - a. **Range: ≥30,000 psi**
       - b. **Economics**
    2. **Application**
       - a. **Contaminate cleansing**
       - b. **Porosity/ light profile**
  - ii. **Acid edging**
    1. **Caustic**
       - a. **Application precaution**
       - b. **Health hazard**
    2. **Corrosive**
       - a. **Environmental**
       - b. **Structural**
- d. **Concrete process**
  - i. **Ingredients**
    1. **Water**
    2. **Portland cement**
    3. **Aggregate**
  - ii. **Mixtures**
    1. **Environmental**
       - a. **Heat**
       - b. **Cold**
    2. **Porosity**
    3. **Permeability**
  - iii. **Curing**
    1. **Mix ratio**
    2. **Porosity**
    3. **Slab thickness**
    4. **ASTM standard**
- e. **Concrete problems**
  - i. **Freeze-thaw**
  - ii. **Spoiling**
  - iii. **Scour effect/ deterioration**
  - iv. **Scaling**
  - v. **Wind shear/ abrasive effect/ failure**
- f. **Concrete problem resolution**
  - i. **Latency**
    1. **Failure remediated**
    2. **Resurface**
  - ii. **Efflorescence segregation**
    1. **Pressure washing**
    2. **Reseal**

1. **Core drilling samples**
   - a. **Purpose**
     - i. **Failure analysis**
     - ii. **Proper application/density**
     - iii. **Cure**
   - b. **Process**
     - i. **Core saw**
     - ii. **Drill sample**
     - iii. **Cylinder analysis**
       1. **Water-cement ratio**
       2. **Mix determination**
       3. **Admixture**

1. **Pipeline: Transport, Environment and Adhesion Testing**
   - a. **Terminology**
     - i. **Adhesion testing**
     - ii. **Destructive testing**

iii. **Non-destructive testing**
iv. **Microscopic**
v. **Ultrasonic testing**
vi. **Mainline**
vii. **Ductile**
viii. **Petroleum tape**
ix. **Pipeline integrity**
x. **Black mastic**
xi. **Fusion bonded epoxy**
xii. **Shot/grit mix**
xiii. **Coal tar enamel**
xiv. **Aquafer**

b. **Pipe types**
i. **Plastic (PVC)**
1. **Water**
a. **Potable**
b. **Non potable**
2. **Compressed arc**
ii. **Concrete**
1. **Waste**
2. **Aquafer**

1. **Iron clad**
a. **Crude oil**
b. **Natural gas**
c. **Distillate**
2. **Ductile**
a. **Water**
b. **Field irrigation**
3. **Pipe lining**
a. **Fusion bonded epoxy**
i. **Powder coat process**
ii. **High heat**
iii. **Steam**
b. **Polyethylene**
i. **Extruded**
ii. **High density**
iii. **Heat**
c. **Foam insulation**
i. **Spray-on**
ii. **Half shell**
iii. **Pipe preparation**
iv. **Foam impermeability**
d. **Tape**
i. **Economical**
ii. **Easy repair**
e. **Coal tar epoxy**
i. **Environmental hazard**
ii. **Durable**
4. **Environmental effects**
a. **Geographically driven**
i. **Seismic**
ii. **Freeze-thaw**
b. **Wind sheer**
c. **Tidal surge**
d. **Coating deterioration**
e. **Water contamination**
f. **Marine life loss**
g. **Microbial**

   h. **Soil contamination**
   i. **Air pollution**
1. **Tests**
   a. **Non-destructive**
      i. **Microscopic**
      ii. **Dry film thickness**
      iii. **Ultrasound**
      iv. **Low/high voltage holiday detection**
      v. **Moisture testing**
   b. **Destructive testing**
      i. **Solvent**
      ii. **Took gage**
      iii. **Saeberg drill**
      iv. **Adhesion**
      v. **Hardness**
         1. **Pencil**
         2. **Durometer**
         3. **Impresser**
2. **Joint repair: Field preparation**
   a. **Hand tooling**
   b. **Solvent cleaning**
   c. **Grinding**
   d. **Sand blasting**
3. **Test abatement**
   a. **Destructive test**
      i. **Depth of coating**
      ii. **Proper application**
      iii. **Adhesion**
   b. **Remediation**
      i. **Re-coat**
      ii. **Scrape and brush**
      iii. **Coating feathering**
      iv. **Replacement of coating**

**Religious Accommodation**

Before reviewing the course schedule, students should carefully review the following religious accommodation policy and other required instructional policies:

**Religious Accommodation:**

Students seeking an accommodation for absences permitted under Ohio's Testing Your Faith Act must provide the instructor with written notice of the specific dates for which the student requires an accommodation and must do so not later than fourteen (14) days after the first day of instruction. Please submit requests for accommodations at this link: https://portal2.tri-c.edu/ReligiousAccommodation/ Religious Accommodation Form. Students with questions about their religious accommodations under Ohio's Testing Your Faith Act may contact the College's Office of General Counsel and Legal Services by phone at 216.987.4856 or via email at legal@tri-c.edu.

**Other Required Instructional Policies:**

https://www.tri-c.edu/student-resources/curriculum/documents/syllabus-part-b.pdf

**Weekly Schedule**

| | Topics |
|---|---|
| Week 1 | Introduction |
| Week 2 | Advanced Corrosion |
| Week 3 | Environmental Controls |
| Week 4 | Advanced Environmental Testing Instrumentation |
| Week 5 | Advanced Environmental Testing Instrumentation: Practical Lab |
| Week 6 | Centrifugal Blast Cleaning |

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|---|---|
| Week 7 | Water-jetting |
| Week 8 | Interpersonal Relationship Dynamics in the workplace |
| Week 9 | Safety |
| Week 10 | Advanced Nondestructive Test Instruments |
| Week 11 | Advanced Nondestructive Test Instruments-Practical Lab |
| Week 12 | Linings and Coatings |
| Week 13 | Thick Barrier Linings |
| Week 14 | Adv. Standards and Resources |
| Week 15 | Coating concrete and Inspections |
| Week 16 | Review |

The Course Schedule is subject to change due to pedagogical needs, instructor discretion, parts of term, and unexpected events.

**Required/Recommended Readings**

Instructor-provided materials

## Resources for the Instructor

International Organization for Standardization. *ISO Standards Handbook*. current. International Organization for Standardization, www.iso.org

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American Society of Testing and Materials. *ASTM Standards* . current. ASTM International, www.ansi.org

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**Additional Resources for the Instructor**

www.sspc.org (https://catalog.tri-c.eduwww.sspc.org)
www.kta.com (https://catalog.tri-c.eduwww.kta.com)

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