Paint 201: High Performance Coatings for Commercial Spaces

Course Number: EL903a

Day, Date, and Time: Thursday, June 21, 2018

2:15 PM – 3:15 PM

Learning Units: 1.00 LU HSW GBCI RIBA

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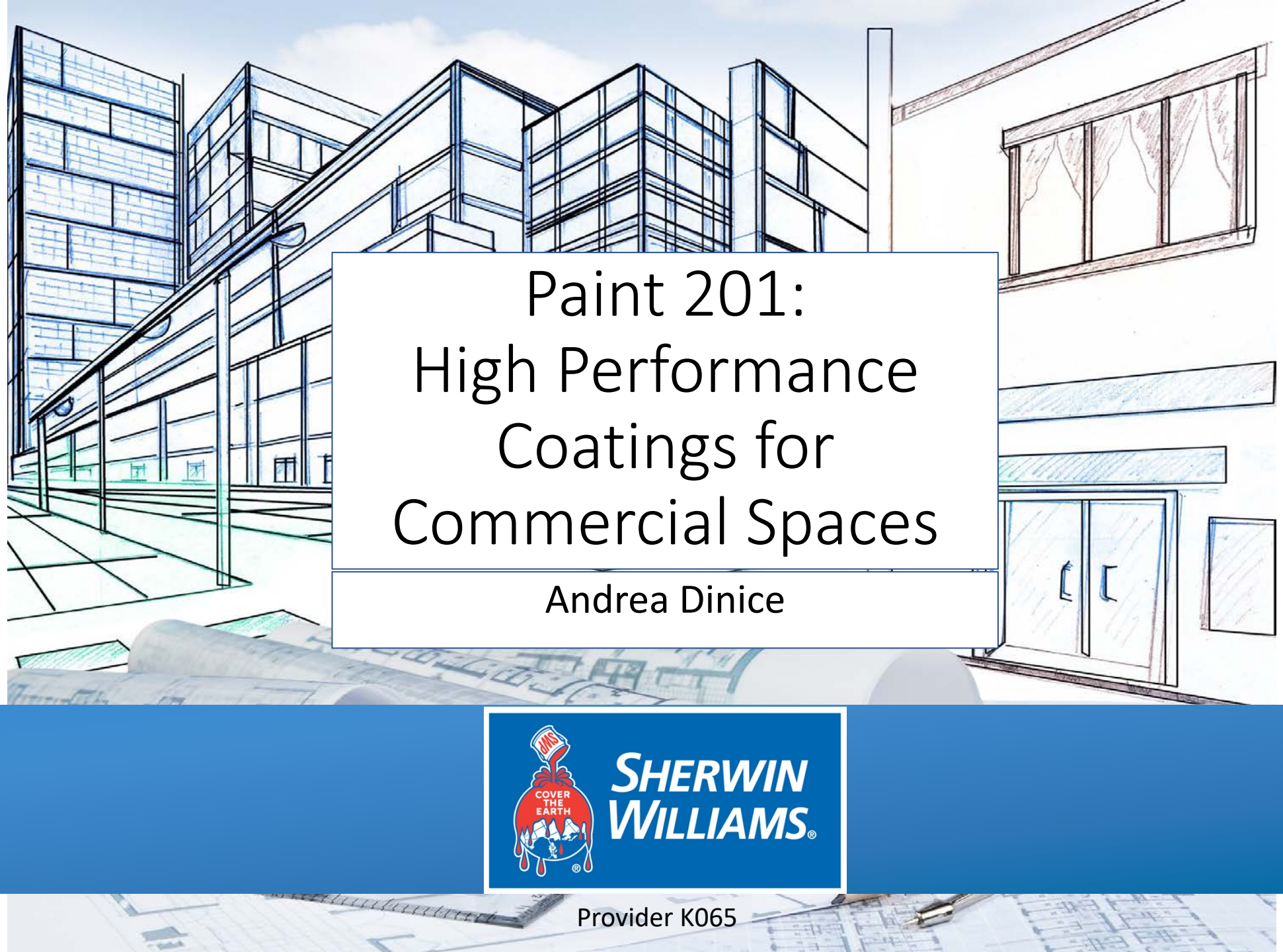
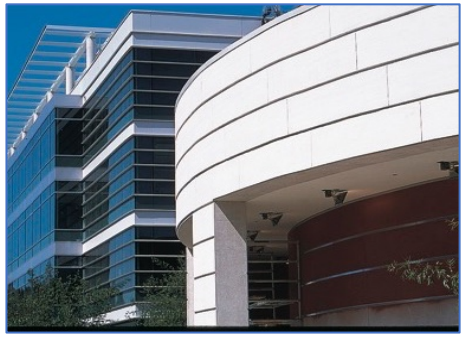


Paint 201: High Performance Coatings for Commercial Spaces

Andrea Dinice

Provider K065

Course Description



Commercial and light industrial projects typically require high-performance coating solutions to provide optimal performance against abrasion, chemicals, moisture and other harsh conditions common to these types of buildings. Technological advancements have created high-performance coatings that not only provide the aesthetics and durability your owners demand – there are also a variety of formulations that can help contribute towards green building certifications.

This course provides solutions to the most prevalent challenges found in busy commercial spaces so that you can specify the coatings best suited to the project type and conditions. We will also explore innovative coating technologies that combine performance benefits that meet the demands of commercial spaces as well as emit lower VOCs.

Learning Objectives

Discuss the conditions that drive coating selection as well as the additional factors that influence coating specifications for commercial and light industrial applications.

Determine optimum coating systems for different types of substrates, project type and aesthetic requirements.

Learn about innovative coating technologies that combine performance benefits with lower VOCs than traditional high- performance coatings.

Review how high-performance coatings can contribute towards green building certifications.

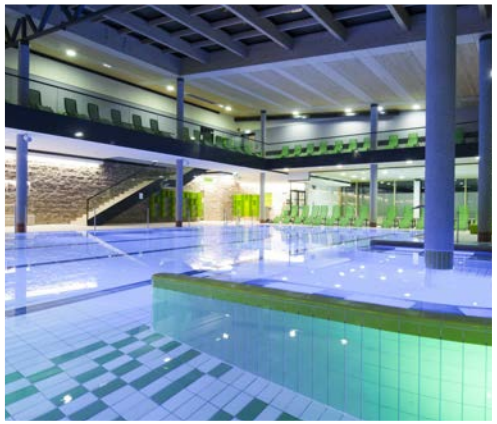
Functional Properties of Paint

1. **Enhances aesthetics:**
   - Colors a surface
   - Provides desired sheen
   - Highlights design elements

2. **Protects a substrate from:**
   - Corrosion
   - Dirt, stains
   - Chemicals
   - Environment

How High Performance Coatings Provide Protection

Protective



Most coatings serve as a protective layer by shielding the substrate from the environment.

Inhibitive

Some primers control corrosion by containing rust inhibitive compounds.

Sacrificial

When a zinc coating is applied to steel, the zinc *sacrifices* itself to protect the steel.

Paint and Coatings: Understanding the Differences

Architectural Paint & Coatings

Traditional architectural paints and coatings are typically specified for normal environmental conditions

High Performance Coatings

High performance coatings utilize technology to create specialized formulations that provide excellent protection in extreme environments

Industrial Coatings

Industrial coatings are engineered to protect substrates in aggressive environments

Architectural Paint & Coatings

Paint Quality Matters

- Premium architectural coatings contain high-quality ingredients that yield *better service* and *longer lifecycle*
- Fewer repaints mean *less disruption* and *cost savings* for the owner over time
- Innovative technologies in architectural coatings can offer *performance benefits* beyond color and protection
  - ***Help to reduce organic odors*** when they come in contact with the painted surface
  - ***Reduce airborne formaldehyde and aldehydes*** when they come in contact with painted surface
  - ***Kill 99.9% of certain harmful bacteria* within 2 hours of exposure*** on the painted surface
  - ***Inhibit growth of mold and mildew*** on painted surfaces

*Staph (*Staphylococcus aureus*), MRSA (Methicillin-resistant *Staphylococcus aureus*), E. coli (*Escherichia coli*), VRE (*Vancomycin-resistant Enterococcus faecalis*), Enterobacter aerogenes

Architectural Paint & Coatings

Hospitality
Guest Rooms

Multi-Family
Units

Common Areas

Offices

High Performance Coatings

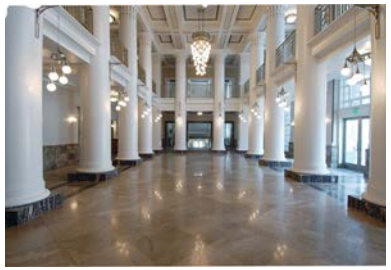
High Performance Coatings

HIGH AESTHETICS Areas Require:

- Smooth finish
- Quick dry times
- Outstanding stain resistance

High Performance Coatings

Examples of **HIGH-AESTHETICS** Spaces



Lobbies

Restaurants and Cafeterias

Retail Stores

Healthcare Facilities

Office Buildings

Hotels/ Hospitality

Museums

Community Centers

High Performance Coatings

HIGH TRAFFIC Areas Require:

- Hard and tough coating
- High abrasion resistance
- Outstanding stain resistance
- Resistance to commercial cleaning solutions
- Smooth finish

High Performance Coatings

Examples of **HIGH-TRAFFIC** Spaces

Schools

Commercial Hallways

Airport Terminals

Transit Stations

Gymnasiums and Sports Venues

Locker Rooms

Theaters and Auditoriums

Light Manufacturing

High Performance Coatings

HIGH EXPOSURE Areas Require:

- Heavy-duty protection
- Resistance to harsh environments
- Resistant to commercial cleaners
- Resistance to repeated washing and cleaning
- Excellent corrosion resistance
- Outstanding moisture resistance

High Performance Coatings

Examples of **HIGH-EXPOSURE** Spaces

Commercial Kitchens

Laboratories

Shower and Wash Rooms

Manufacturing/ Processing Plants

Public Restrooms Laundry Facilities

Animal Clinics

Indoor Pool Areas

Chemical Storage Areas

Environmental Conditions

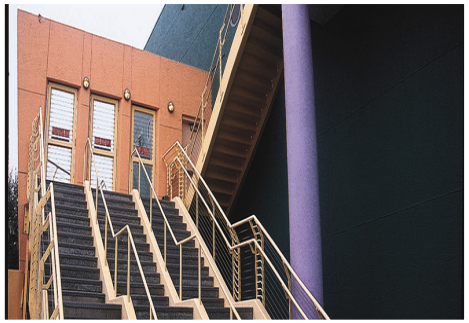
NORMAL:

Traditional Interior and Exterior Paint

SEVERE:

High Performance Coatings

Severe Conditions



Abrasion

Chemicals

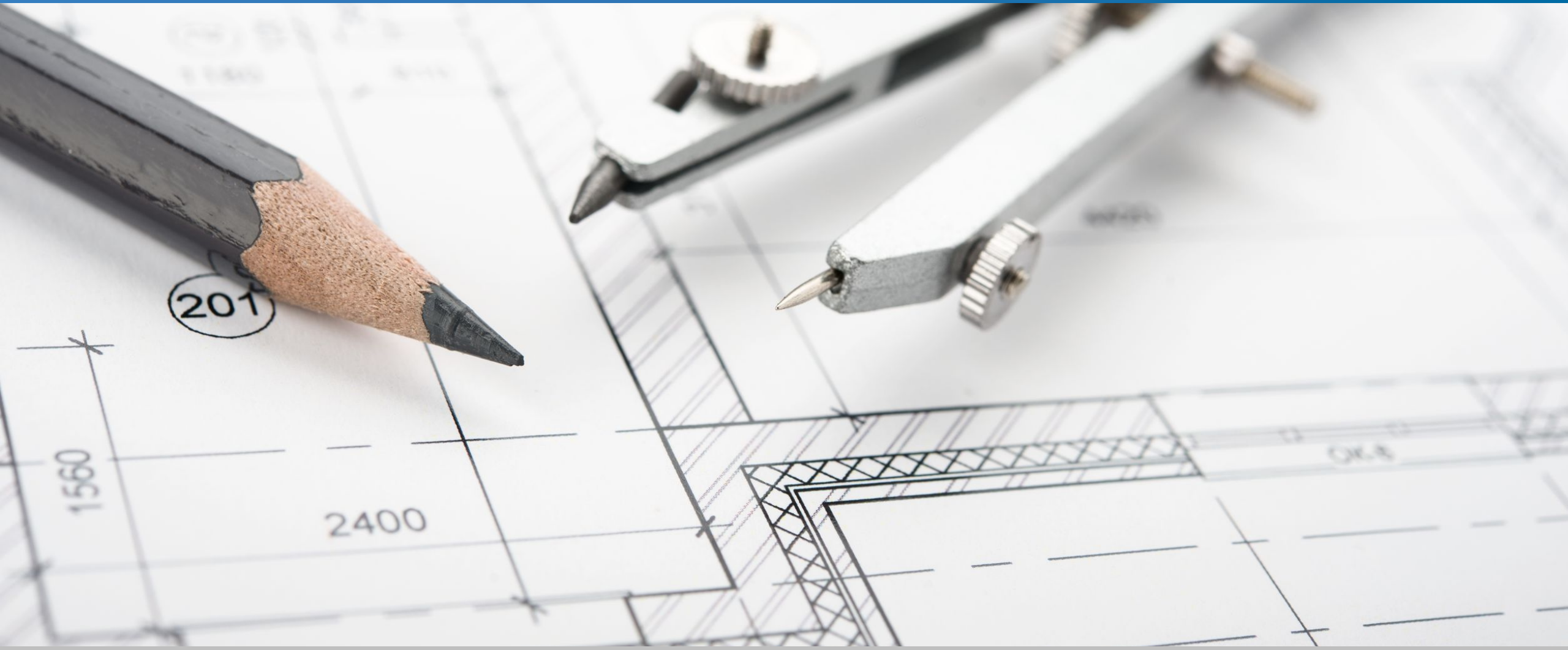
Moisture

Corrosion

UV Exposure

Vehicle/
Fork-lift traffic

Specifying High Performance Coating Systems



Specifying High Performance Coatings

Substrate

- Substrate material
- Condition

Surface Prep

- Requirements for severe conditions
- Level of surface prep
- High performance primers

Coating Types

- Coating types
- Innovative coating technologies
- Sheen/finish

VOC Regulations

- VOC regulations by area
- LEED v4 and other green building certifications

Substrates

Surface Preparation
Normal Conditions

SOUND CONDITION

Surface must be solid and not degrading in any way

CLEAN

All surface contaminants must be removed

DRY

All porous substrates must be thoroughly dry before coating

DULL

Surface must have a “profile” to promote adhesion

WARNING! Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.

Surface Preparation

Severe Conditions

Minimum recommended surface preparation:

Iron & Steel:	
Atmospheric:	SSPC-SP6/NACE 3, 2 mil (50 micron) profile or SSPC-SP12/NACE No. 5, WJ-3/NV-2
Immersion:	SSPC-SP10/NACE2, 2-3 mil (50-75 micron)profile or SSPC- SP12/NACE No. 5, WJ-2/NV-2
Concrete & Masonry:	
Atmospheric:	SSPC-SP13/NACE 6, or ICRI No. 310.2 CSP 2-3
Immersion:	SSPC-SP13/NACE 6-4.3.1 or 4.3.2, or ICRI No. 310.2 CSP 2-3

Surface Preparation Standards

	Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal		Sa 3	Sa 3	SP 5	1
Near White Metal		Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast		Sa 2	Sa 2	SP 6	3
Brush-Off Blast		Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	Rusted	C St 2	C St 2	SP 2	-
	Pitted & Rusted	D St 2	D St 2	SP 2	-
Power Tool Cleaning	Rusted	C St 3	C St 3	SP 3	-
	Pitted & Rusted	D St 3	D St 3	SP 3	-

Levels of Surface Prep

SOLVENT CLEANING SSPC-SP 1

- Removes all visible grease, oil, soil, drawing and cutting compounds, and other soluble contaminants from surface

POWER TOOL CLEANING SSPC-SP 3

- Removes all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter. (Excluding mill scale, rust, and paint that can't be removed with dull putty knife.)

COMMERCIAL BLAST SSPC-SP 6 / NACE 3

- Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products and other foreign matter. Random staining shall be limited to no more than **33%** of each unit area. This standard addresses cleanliness only and does not specify surface profile.

NEAR-WHITE BLAST CLEANING SSPC-SP 10/ NACE 2

- Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products and other foreign matter. Random staining shall be limited to no more than **5%** of each unit area. This standard addresses cleanliness only and does not specify surface profile.

Primers

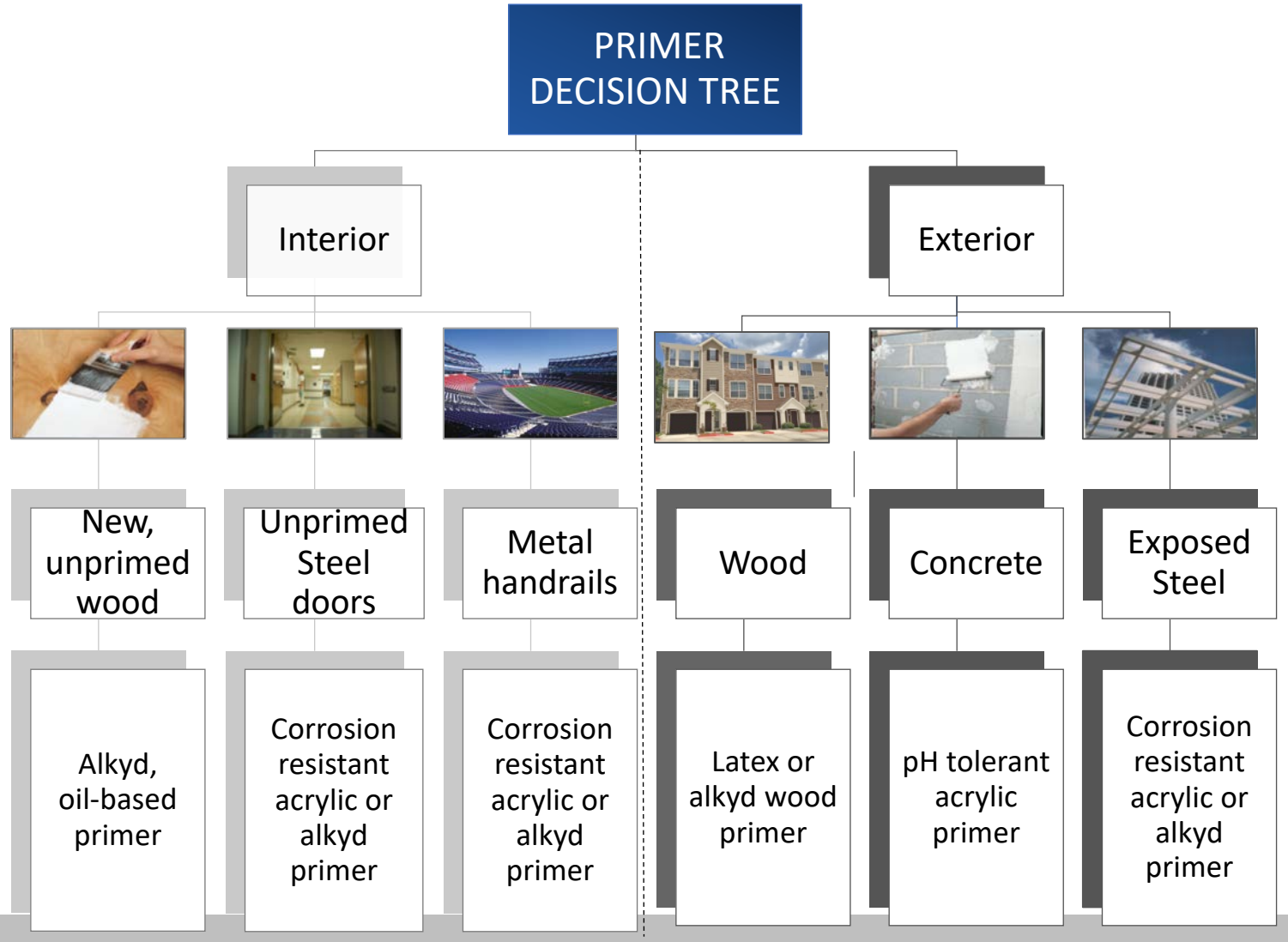
- Primers are the foundation of any paint system
- Primary considerations:
  - Interior/Exterior
  - Substrate
  - Environmental exposure
  - Type of topcoat
- Primers are available in a variety of formulations that are compatible with different topcoats



Purpose of a Primer

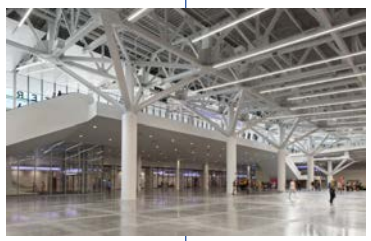
- Adhesion
- Corrosion resistance
- Seals surface for uniform gloss of topcoat
- Stain-blocking
- Surface/Filler

Primer Selection



Primer Selection

HIGH PERFORMANCE PRIMERS



Acrylic Primers

Inhibits rust on prepared steel under water- or solvent-based topcoats

Alkyd Primers

Protects steel surfaces against atmospheric corrosion under alkyd or latex topcoats

Epoxy Primers

Can apply directly to marginally prepared steel surfaces to protect in industrial exposures

Zinc Primers

Zinc dust pigment is mixed with a resin to create a galvanized-like coating

Coating Finishes

High — AESTHETICS

Minimum — DURABILITY — Maximum

Generic Coating Types

Different coating types serve different purposes

- Acrylics
- Alkyds
- Epoxies
- Urethanes
- Hybrids

Acrylic Coatings

BENEFITS
Acrylic

- Waterborne product
- Lower odor compared to solvent-based coatings
- Lower VOCs
- Good color & gloss retention
- Ease of application
- Fast drying time
- Flexible films

+

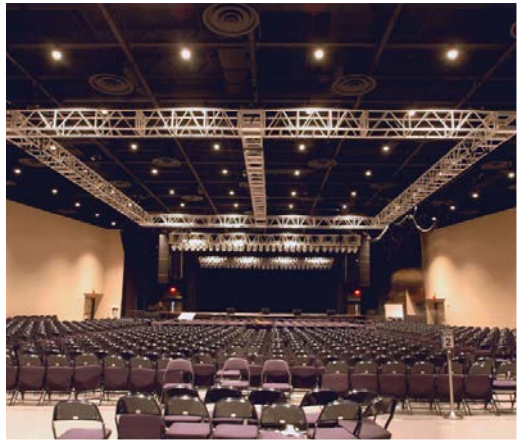
LIMITATIONS
Acrylic

- Substrate must be thoroughly prepared and clean

-

High Performance Acrylic Coatings

Waterborne Acrylic Dryfall



- Adheres to Properly Prepared Surfaces

High Performance Acrylic

- All Substrates
- Doors and trim
- Areas of high UV
- Building Exteriors
- Equipment
- Piping
- Structural Steel

Direct to Metal Acrylic

- Corrosion
- Steel or Metal Substrate
- Exterior Performance
- Blocking Resistance

Light Duty ↕ Heavy Duty

Alkyd Coatings

BENEFITS
Alkyd

- Good flow and leveling
- Blocking properties
- Strong adhesion
- Smooth, uniform finish
- Hard non-porous finish
- Able to apply at lower temperatures

+

LIMITATIONS
Alkyd

- Strong solvent odor
- Higher VOC content
- Slow-drying
- Will “yellow” with age
- Becomes brittle with age
- Chalk and fade in exteriors

-

Hybrid Coating: Acrylic Alkyd

- Alkyd performance characteristics with acrylic properties
- Excellent flow, leveling and sag resistance for a smooth, durable finish
- Non-yellowing compared to conventional alkyds
- Lower VOC compared to solvent-based alkyds

Hybrid Coating: Urethane Alkyd Enamel

- Urethane modification provides better color and gloss retention
- Resists chipping and flaking, even in high wear areas
- Excellent application properties deliver an outstanding appearance
- Versatile coating for a variety of interior and exterior applications

High Performance Alkyd Coatings

Acrylic Alkyd

- Doors
- Trim
- Cabinets
- Furniture

Urethane Alkyd Enamel

- Door and jambs
- Beams and columns
- Safety coating marking
- Handrails
- Structural steel
- Piping

Oil Based Alkyd Enamel

- Railings
- Steel doors
- Metal cabinets
- Lockers
- Bar joists
- Structural steel

Light Duty ⟷ Heavy Duty

Epoxy Coatings

BENEFITS
Epoxy

- Pre-catalyzed epoxies are one-component
- Hard & durable
- Moisture resistance
- Chemical resistance
- Corrosion resistance

LIMITATIONS
Epoxy

- Catalyzed epoxies require additional steps for application
- Solvent-based epoxies have a strong odor
- Chalk & fade in exterior exposures

Hybrid Coating:
Pre-Catalyzed Water Based Acrylic Epoxy

- One-component, water based acrylic epoxy provides the performance typical of solvent-based epoxies and the adhesion properties expected of a two-component product.
- Offers lasting protection against stains and abrasion
- With a water based formula, acrylic epoxy can be applied in occupied areas, reducing downtime and disruptions in busy, high-traffic areas

High Performance Epoxy Coatings

Pre-Catalyzed Water Based Acrylic Epoxy

- Hospital, school and transit corridors
- Bathrooms and locker rooms
- Manufacturing facilities and warehouses
- Correctional institutions
- Laboratories

Water Based Catalyzed Epoxy

- Commercial Kitchens
- Laboratories
- Schools
- Clean Rooms
- Lavatories
- Commercial & Institutional Walls

Solvent Based Epoxy

- Showers
- Manufacturing facilities
- Kennels and animal holding and cage wash areas

Light Duty ↔ Heavy Duty

Urethane Coatings

BENEFITS
Urethane

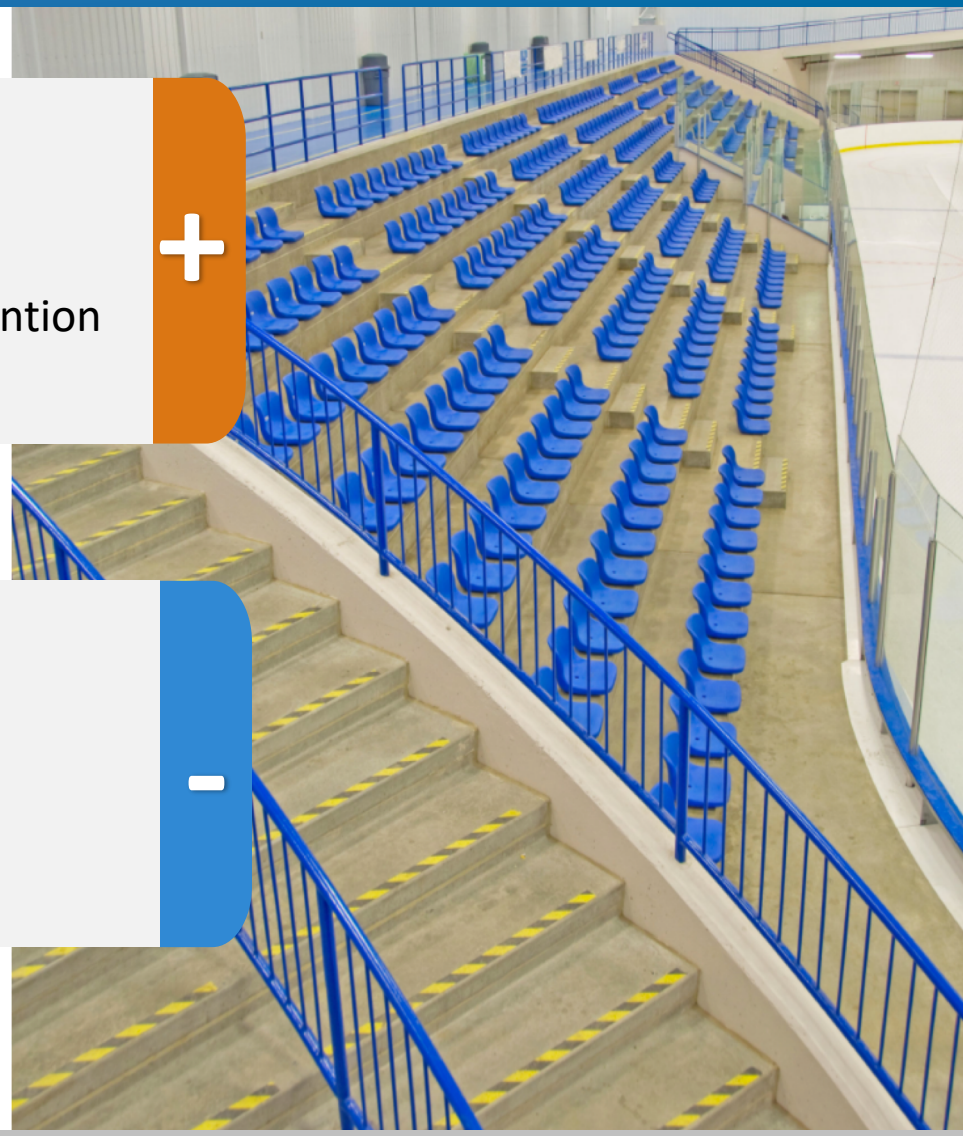
- UV resistant
- Chemical resistant
- Hard film, yet flexible
- Excellent color and gloss retention

+

LIMITATIONS
Urethane

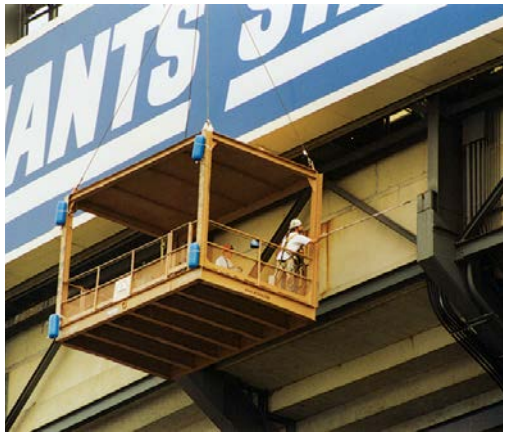
- Price
- Two-component system
- Difficult to overcoat/ limited ability to re-coat

−



Hybrid Coatings:
Waterbased Acrylic Urethane

- Provides performance properties comparable to premium quality solvent based urethanes.
- High gloss, abrasion resistant urethane that has excellent weathering properties
- Retains its appearance over a wide range of chemical, weather, and mechanical conditions
- Can be applied directly to water based and solvent based organic zinc rich primers
- Lower odor and lower VOCs than solvent based urethanes



Hybrid Coatings: Waterbased Alkyd Urethane

- Interior and exterior coating
- Combines:
  - Durability of a urethane
  - Super smooth surface and excellent washability of an enamel
  - Easy application of a waterbased coating
- Lower VOCs than solvent based urethanes
- Suited to heavy traffic areas where aesthetic standards are important including education, transportation and multi-family spaces.

High Performance Urethane Coatings

Water Based Urethane

- General industrial
- Corporate logos
- Bridge and highway
- Amusement parks

Moisture Cured Urethane

- Stadiums
- Water tanks
- Sports complexes
- Bridges

Water Based Acrylic Urethane

- Structural steel
- Bridges
- Conveyors

Light Duty ↕ Heavy Duty

Summary of Coatings by Condition

Moisture Resistance

- Catalyzed Water Based Epoxy
- Solvent-Based Epoxy

Chemical Resistance

- Epoxy or Urethane topcoat

Long-Term UV Exposure

- Acrylic
- Urethane

Corrosion Resistance

- Epoxy or Zinc Primer
- Solvent-Based Epoxy topcoat

Abrasion Resistance

- Acrylic
- Pre-Catalyzed Water Based Epoxy
- Catalyzed Water Based Epoxy
- Urethane

High Performance Floor Coatings

High Performance Floor Coatings

- Floors in busy commercial spaces also demand a high-performance coating
- Systems are available that mitigate moisture, provide impact-resistance and durability in high-traffic areas, and can complement the design scheme in high-traffic, high-profile spaces

Moisture Mitigation

High-Traffic Areas

High-Aesthetic Areas

Floor Coating Comparison

Acrylic

+
- Water clean-up
- Easy maintenance

−
- Suited for light foot traffic only

Epoxy

+
- Excellent adhesion
- Chemical resistance

−
- Poor UV resistance

Urethane

+
- Excellent color & gloss retention
- Excellent chemical resistance

−
- Cost

Terrazzo

+
- Extremely durable
- Excellent life cycle cost

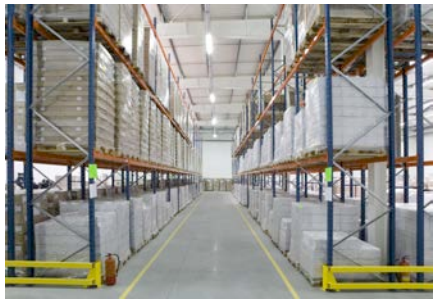
−
- Initial cost
- Complex installation

High Performance Epoxy Floor Coatings

- Water based epoxy floor coatings are easy to apply
- Provide excellent chemical and abrasion resistance
- Breathable
- Can be used as a stand alone coating or as a receiver coat for paint chip floors

Healthcare Floors

Commercial Floors



Warehouse Floors

Car Dealers/ Service Centers

High Performance Urethane Cement Floor Systems

Urethane binder resins for slurry and mortar base materials:

- Moisture Vapor Emission (MVE) tolerant
- Fast installation turnaround – rapid cure
- Can be installed in cool, damp conditions
- Excellent chemical resistance
- Excellent thermal shock resistance
- Maximum jobsite flexibility
- Ease and speed of repair

Floor Coating System Uses

URETHANE CEMENT SYSTEM

- Food processing
- Bottling areas
- Kitchens
- Dairies
- Loading docks
- Pharmaceutical manufacturing

DECORATIVE QUARTZ BROADCAST

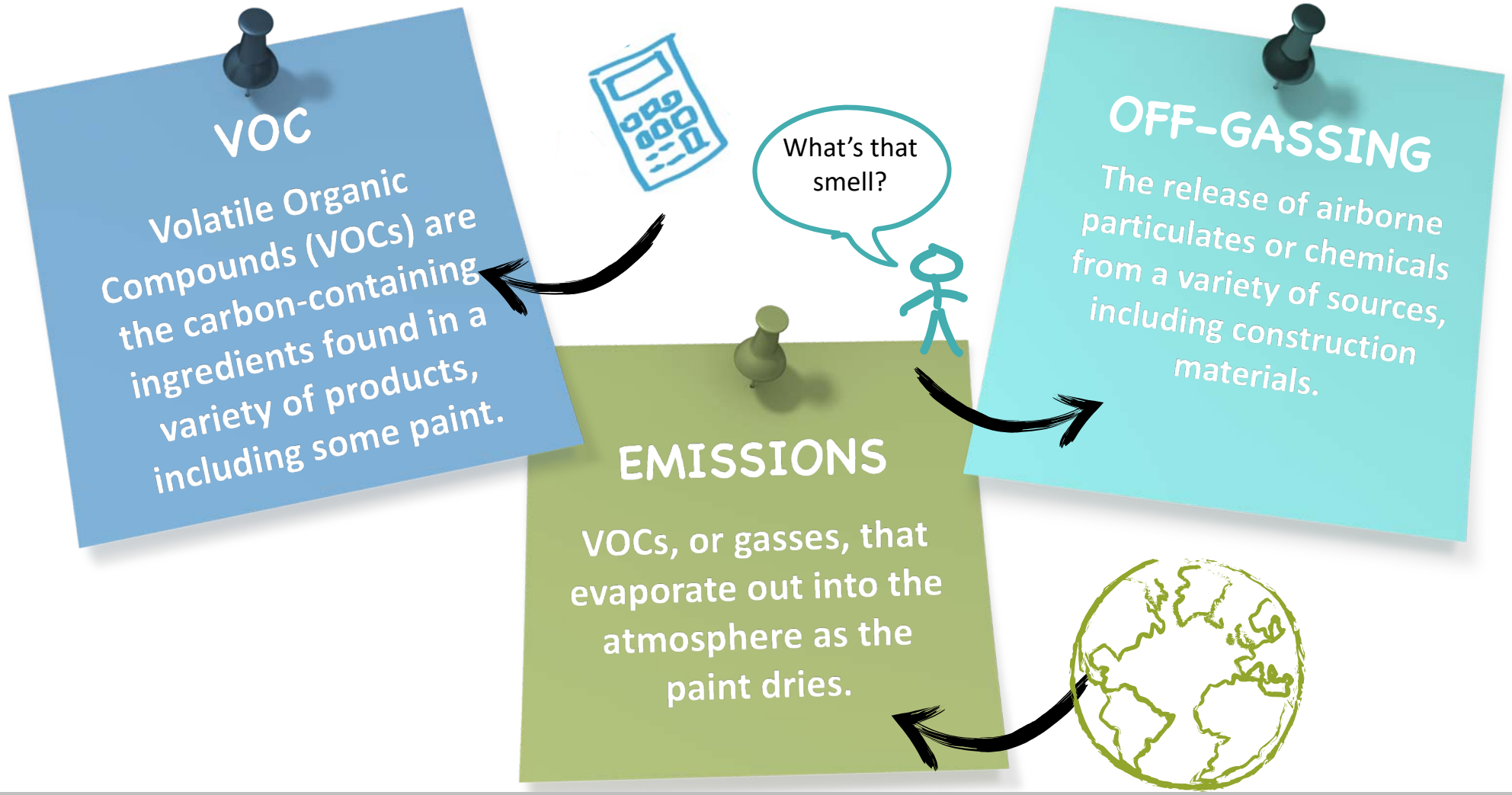
- Commercial kitchens (areas where temperature will not exceed 160^{o}F in service)
- Animal care
- Clean rooms
- Pharmaceuticals
- Locker and restrooms
- Packaging & storage areas

SLURRY & BROADCAST SYSTEM

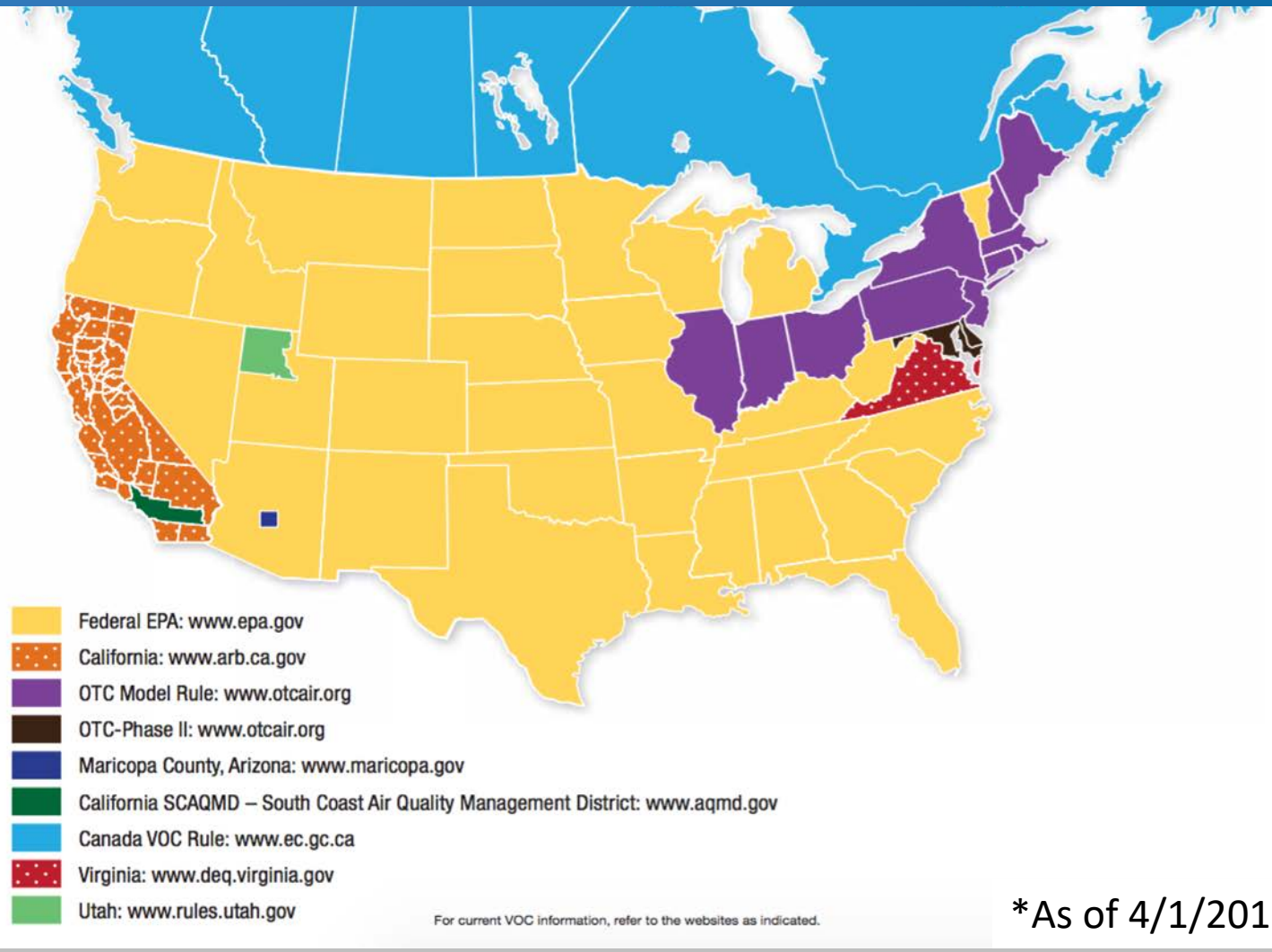
- Locker rooms
- Bathrooms, showers
- Correctional cells
- Animal holding areas
- Laboratories
- Food service and cafeterias

High Performance Coatings and Green Building Standards

Terms and Definitions



VOC Regulated Locations



*As of 4/1/2017

3rd Party Certifications

- Resources such as UL GREENGUARD can help you determine products that comply and may help earn LEED points

Certification Mark(s):

[UL GREENGUARD Sustainable Product Guide]

Sustainable Building Programs Credits & Codes:
This Product Contributes To:

- ASHRAE 189.1
  - 8.4.2.2.1 : Paints & Coatings
  - 8.5.2 e : Adhesives & Sealants/Paints & Coatings
- CHPS
  - 2.2.2 : Paints & Coatings
- Green Globes
  - 12.2.2 : Paints & Coatings
  - 3.7.2.1.3 Volatile Organic Compounds - Paint
- Green Guide for Health Care 2.2
  - EQ Credit 4.2 : Paints & Coatings
- International Green Construction Code
  - 806.3 (2) : Paints & Coatings
  - A108.5 : TVOC Project Elective
- LEED 2009 for Commercial Interiors
  - ID Credit : Paints & Coatings
- LEED 2009 for Core & Shell
  - ID Credit : Paints & Coatings
- LEED 2009 for New Construction
  - ID Credit : Paints & Coatings
- LEED 2009 for Retail: Commercial Interiors
  - IEQ Credit 4: Option B : Paints & Coatings
- LEED 2009 for Retail: New Construction
  - IEQ Credit 4: Option B : Paints & Coatings
- LEED 2009 for Schools
  - IEQ Credit 4.2 : Paints & Coatings
- LEED v4 - Building Design & Construction
  - EQ Credit 1: Enhanced Indoor Air Quality Strategies – Option 2 Additional Enhanced IAQ Strategies - D
  - EQ Credit 4: Indoor Air Quality Assessment - Option 2 Air Testing
- LEED v4 - Homes
  - EQ Credit 2: Contaminant Control – Option 4 Air Testing
  - EQ Credit 7: Low-Emitting Materials

v4 EQ: Low-Emitting Materials

Project teams have two options to earn points:

1. **Product Category Calculation**

   The threshold level of compliance with emissions and content standards for the 6 categories of materials, 7 for Healthcare and Schools

   The more compliant products used, the more points earned, up to 3 possible points

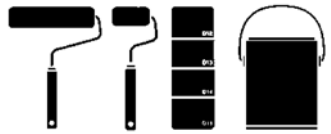
2. **Budget Calculation Method**

   If some products in a category do not meet the criteria, they can determine the total % of surface area painted with compliant products.

   - ≥ 50% to ≤ 70% will earn 1 point
   - ≥ 70% to ≤ 90% will earn 2 points
   - ≥ 90% will earn 3 points

3 Possible Points

6 Categories of Materials



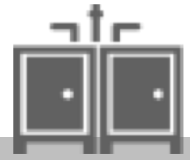
Interior Paint & Coatings

Interior Adhesives & Sealants

Flooring

Composite Wood

Insulation

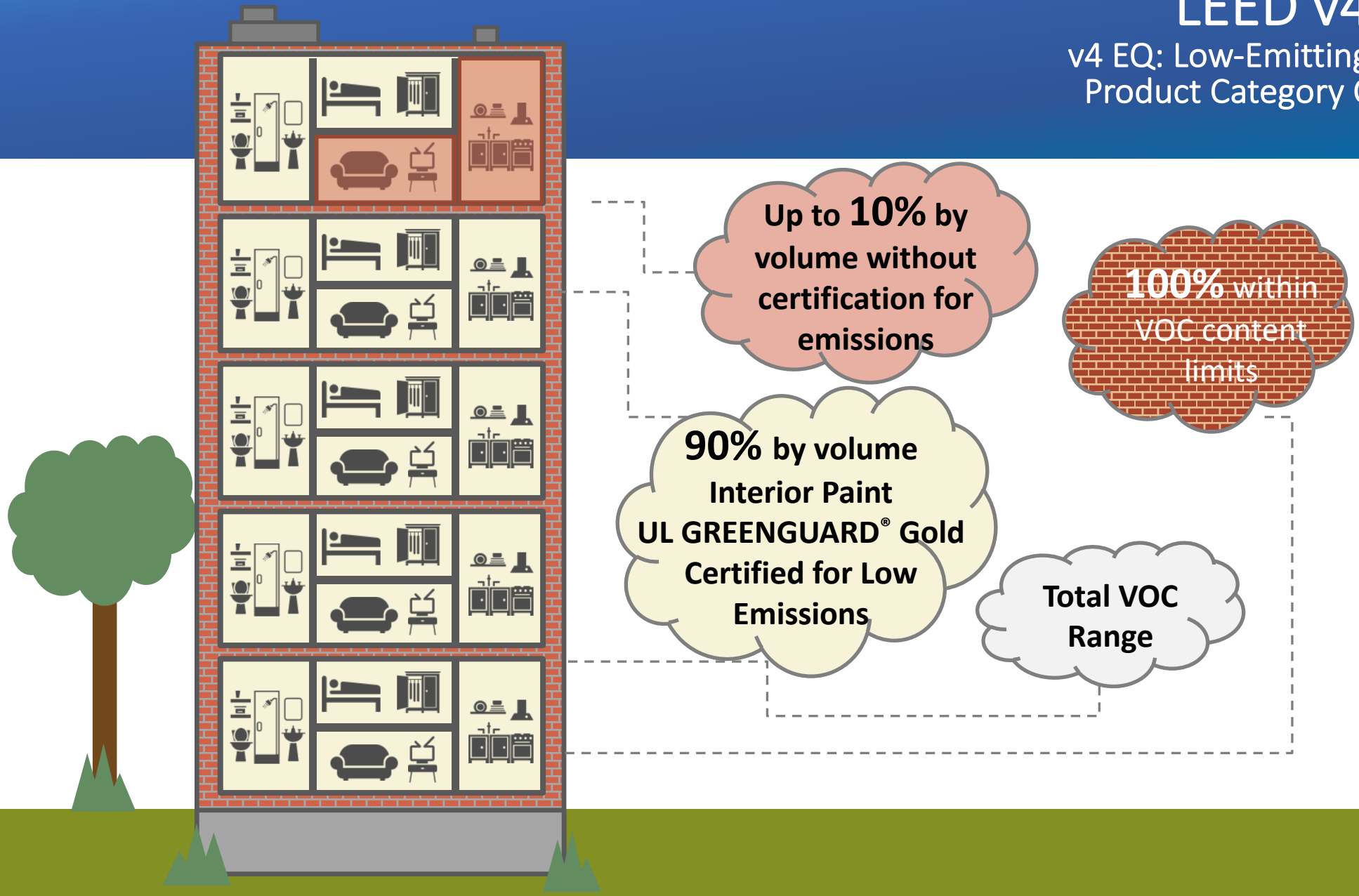


Furniture

Source: LEED v4 User Guide, October 2013, USGBC.org

LEED v4 BD+C

v4 EQ: Low-Emitting Materials Product Category Calculation Example



Up to **10%** by volume without certification for emissions

100% within VOC content limits

90% by volume Interior Paint UL GREENGUARD® Gold Certified for Low Emissions

Total VOC Range

LEED v4 Point Opportunities: High-Performance Paints & Coatings

EQ credit (Emissions)

CAN HELP EARN FROM **1 TO A MAXIMUM OF 3 POINTS** WITH OTHER ELIGIBLE PRODUCTS

LOW-EMITTING MATERIALS

- Look for products with UL Greenguard® Gold certification for emissions, VOC content

MR credit (Transparency)

CAN HELP EARN **UP TO 2 POINTS** BY USING 20 PRODUCTS FROM 5+ MFRs FROM EACH OF THE FOLLOWING CATEGORIES

ENVIRONMENTAL PRODUCT DECLARATIONS

- Look for:

  3rd party certified EPDs, such as NSF International

MATERIAL INGREDIENT DISCLOSURES

- Look for:

  USGBC Approved Programs such as Product Lens™

Value of High Performance Coatings to Your Owner

Expected Cost of Coating

Labor Cost

+

Initial Cost of Paint & Materials

Total Initial Cost

÷

Expected Service Life

Estimated Cost/Year

Considerations:

- Expected durability
- Application characteristics
- Maintenance or re-paint schedule
- Disruption of business for maintenance/re-paint

Initial Cost (Labor + Materials) ÷ Service Life = Estimated cost/year over the life of the coating

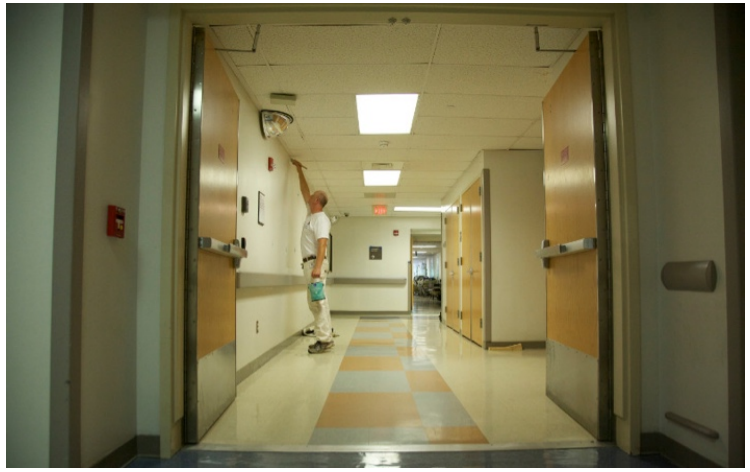
Cost-Benefit Example

Coating System	Total Cost* (based on 30,000 sq. ft.)	Estimated Service Life	Life Cycle Cost Per Year
Standard Coating	$69,000.	12 years	$5,750.
High Performance Coating	**$99,300.**	**25 years**	**$3,972.**

*Total cost does not include containment, mobilization, surface preparation, waste disposal, and related costs.

Which Coatings Would You Specify?

"Application" Activity



Which Coatings Would You Specify?

Project: Office Building Lobby

Substrates

- Walls: Gypsum Board
- Flooring: Concrete
- Balcony: Metal railing

Conditions

- High-traffic
- High aesthetics
- Frequent cleaning with chemicals

Additional Requirements

- Smooth finish for walls
- Meet stringent VOC regulations

Which Coatings Would You Specify?

Project: Commercial Kitchen

Substrates:

- Walls: Gypsum Board
- Flooring: Concrete

Conditions

- High traffic
- High exposure to chemicals, moisture and abrasion
- Needs to be block stains and be washable
- Thermal shock to floor with frequent steam cleaning
- Extremely durable

Additional Requirements

- Meets stringent VOC regulations

Which Coatings Would You Specify?

Project: Office and Corridor

Substrates

- Walls: Gypsum Board
- Flooring: Concrete

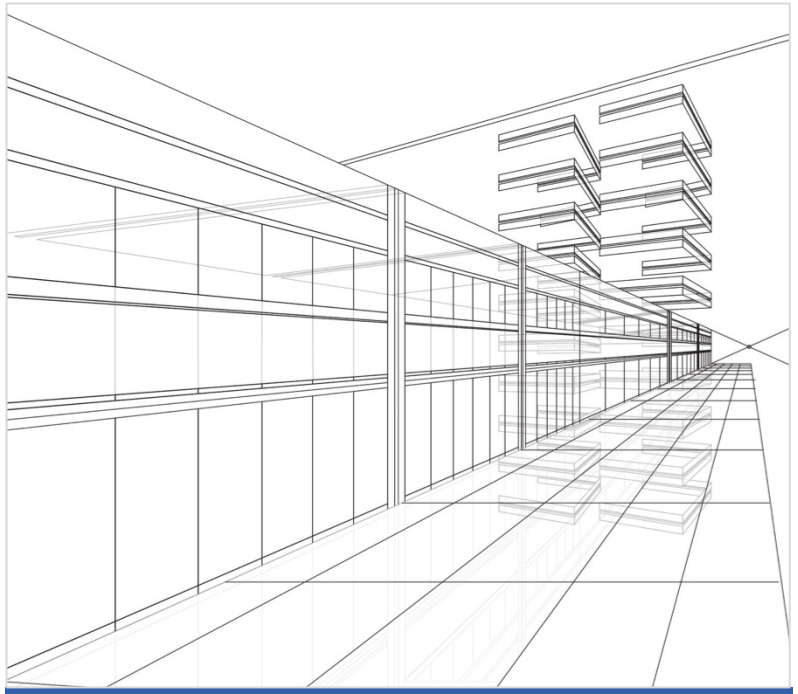
Conditions

- High-traffic
- Touch-up/re-paint while occupied to minimize downtime
- High aesthetics

Other Requirements

- Pursuing points in low Emitting Materials category in LEED v4

Which Coatings Would You Specify?



Project: Student Center

Substrates

- Walls: CMU
- Flooring: Concrete

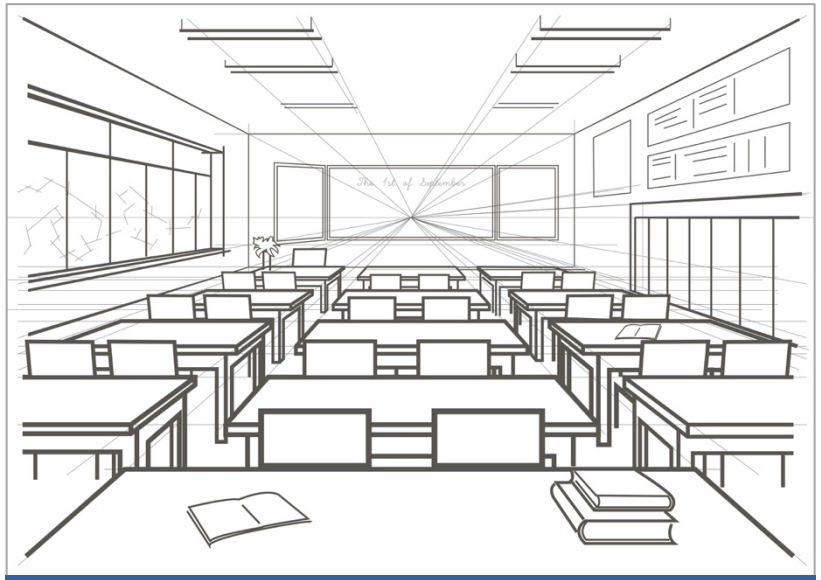
Conditions

- Wall coatings need to be abrasion resistant for durability against backpacks, sports equipment, etc.
- Heavy foot traffic
- Frequent exposure to cleaning chemicals

Aesthetic Requirements

- School colors as part of overall design scheme
- Incorporate school logo

Which Coatings Would You Specify?



Project: Classroom

Substrates

- Walls: Gypsum Board
- Flooring: Concrete

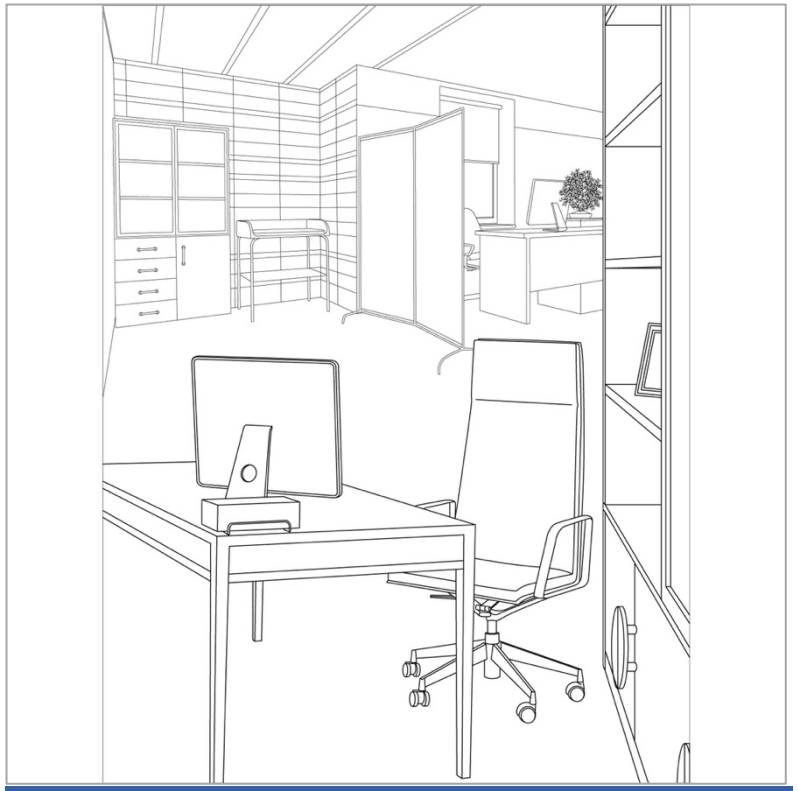
Conditions

- High traffic requires durable coating
- High exposure to abrasion, chemicals
- Must be easy to clean block stains

Additional Requirements

- Meets stringent VOC regulations

Which Coatings Would You Specify?



Project: Doctor's Office

Substrates

- Walls: Gypsum Board
- Doors: Ferrous Metal
- Trim: Wood
- Flooring: Concrete

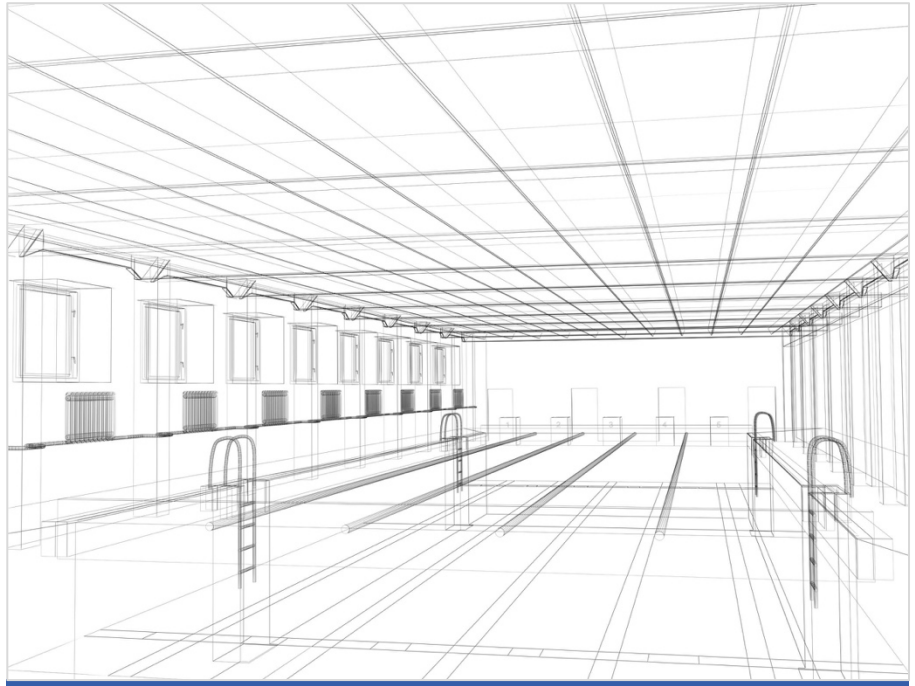
Conditions

- Frequent cleaning with chemicals to prevent spread of disease-causing bacteria
- Medium to heavy duty floor system with rubber- and steel-wheeled traffic

Additional Requirements

- High aesthetic
- Smooth finish
- Color suited to healthcare environment
- Meets stringent VOC regulations

Which Coatings Would You Specify?



Project: Indoor Pool Area

Substrates

- Walls: CMU
- Ceiling: Galvanized Decking
- Metal rails: Ferrous Metal

Conditions

- High exposure to moisture, chemicals

Additional Requirements

- High aesthetics
- Smooth finish

Key Takeaways

- High performance coatings offer increased durability and protection under extreme conditions and in high-traffic, high-aesthetic and high-exposure situations.
- Specifying a high-performance coating system begins with: selecting the proper *primer* for the *substrate* and condition, paying special attention to *surface preparation*, and selecting the *optimal coating* for the conditions and within *VOC requirements*.

- Advances in high performance coating technology mean that an owner doesn't have to sacrifice LEED certification at the expense of added durability and protection in extreme conditions.
- The added durability of high performance coatings results in less frequent repaints, less downtime and disruption, and lower expected costs.

Thank You!

Questions?

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