Level 2 - RSM

DESCRIPTION OF THE SUBSTRATE

Block Manufacture and Design

Concrete blocks, or Concrete Masonry Units (CMU's) have been used more in recent years for exterior walls on large, low-rise warehouse and commercial construction. The process of ma
mixing cement, gravel, sand and water into a paste and pouring it into molds that uses vibration and pressure to form a rectangular block, typically measuring 8" x 8" x 16." After it's remov
undergoes an accelerated curing process at an elevated temperature that evaporates the water and binds the cement, sand, and gravel together into a hardened block. The block is then s
out over a 14-30 day period before being shipped to the distributor or construction site.

Specifications describing concrete block compressive strength and water absorption are described in ASTM standards C55, C145, C90, and C129, and CSA A165.1.

There are a large variety of block types and shapes manufactured. Smooth sided blocks are generally known as "standard" and scored, split face, fluted, etc. are referred to as "profiled." D
colored pigments can be added to the mixture to achieve custom colors.

The concrete mixture and proportions of ingredients dictate the density, strength, and porosity of the surface. Semi lightweight and lightweight blocks substitute lightweight aggregates such
and these have much lower density than the standard types. While the lighter weight block may offer advantages from a general construction perspective, the lower density and high porosi
for easier ingress of water and the problems/issues that come with it. Also, the density of block will also have a significant effect on coating consumption: the more porous lightweight block
the amount of block filler to produce a "filled" surface. All these factors can ultimately affect which coating system we choose.

Regardless of the type or shape, concrete block has a very porous surface and usually requires a block filler as the primer to create a surface suitable for the application of most coatings.

CMU Construction

CMU offers advantages over other types of concrete construction. Tilt-up, for example, creates a wall that's 4" thick. Concrete Masonry Unit (block) constructed buildings are typically const
rectangular blocks stacked on top of one another with a mortar mix made up of cement, sand, additives, and water acting as the glue that holds them in place — a method also referred to a
Rows of blocks are added to achieve the desired height of the building. Concrete block walls are typically 8" thick and more energy efficient than tilt-up. If desired, insulation material may b
blocks, and some kind of finishing system and insulation may be added on the inside wall that may or may not incorporate an air barrier membrane.

Likely Causes for Coating Failure

MOISTURE ISSUES

If the right coating products are specified and applied properly, coatings on concrete block can provide a long lasting finish. However, both liquid water and water vapor within the block mu
controlled, or premature failure can occur.
Issues with moisture will evidence themselves in the form of efflorescence; blistering and/or peeling of the paint film; or stains to both the exterior and interior surfaces. Moisture can infiltrat
including vapor drive; defects in construction; or from the outside.

Vapor Drive

Moisture vapor naturally travels through walls to achieve balance, and there are a number of conditions that increase vapor drive from one side to the other. One is the porosity of the wall,
For example, under the right conditions and especially if the wall is not insulated, a difference in relative humidity (usually higher humidity inside and lower humidity outside) can cause air c
fall beneath the dew point while circling inside the block, causing water vapor to condense and wet the interior of the block.

Temperature differences will also drive moisture vapor from inside to outside and vice versa; moisture vapor naturally moves from the warm side of a wall to the cold side. Which side is wa

MPI ONLINE TRAINING

Powered by MPI

MPI REPAINT SYSTEMS

Exterior and Interior Systems Options

4.2 Concrete Masonry Units

Options for Exterior Systems

Options for Interior Systems

SURFACE PREPARATION FOR CMU AND BRICK

If the current coatings are intact overall and an overcoat is all that's necessary, preparation protocols for CMU are similar to those used for concrete. Preparation of the different types of CM fluted) differ as follows: if grooves in scored block are bridged or filled in, they must be cleaned out by grinding with hand or power tools or whatever mechanical means are required, and th primer, if needed. With split face, scored, and fluted CMU, hand tooling during preparation may be necessary due to the unevenness of the blocks.

However, with buildings constructed from brick or CMU, there is a limit to how many times a wall can be refurbished simply by power washing and/or roughening the surface and applying a the concerns discussed in the opening section (incompatibility of the existing coating with the desired repaint material, or the existing coating being too poorly adhered to support the weigh coat), CMU and masonry surfaces pose the additional consideration that adding another coat to what's already there may reduce the permeability of the system to the point that moisture v

In these cases, some or all of the existing coating needs to be removed with proper surface preparation practices. And full removal of failing coatings on CMU or brick surfaces can add sig maintenance painting.

Shortcomings of Surface Prep Standards

As we discussed in the section on Concrete, there are industry standards describing methods of surface preparation for concrete and masonry surfaces — however, most of the standards rather than painted CMU or brick.

Also, the standards do not describe definitively the degree of cleanliness beyond stating that a sound concrete surface free of laitance, glaze, efflorescence, and incompatible curing compo provide specific acceptance criteria when removing existing paint from these substrates.

Standards that may be referenced (along with their potential shortcomings for use with CMU and clay masonry surfaces) include:

SSPC-SP13/NACE No. 6, Surface Preparation of Concrete

Many of the methods described within (abrasive blasting, shotblasting, wet blasting) can remove existing coatings but may significantly roughen or damage block or brick and mortar joints.

SSPC-SP12/NACE No. 5 Surface Preparation and Cleaning of Metals by Water Jetting Prior to Recoating

Wet methods will remove poorly adhered coating, allow intact coating to remain, or completely remove existing coating if higher pressures and dwell times are used. While these are less d surfaces, some roughening will occur. And while the methods described in the standard are suitable for use on concrete and masonry surfaces, the acceptance criteria described for each metallic substrates.

ASTM D4259, Standard Practice for Abrading Concrete.

This practice addresses methods for removing coatings and roughening the surface but many of the methods described can damage the substrate.

ICRI Guideline No. 310.2-1997 (formerly No. 03732), Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays

We described this in detail in the preceding "Concrete" section. Some of the methods described are suitable for removing coatings from CMU and brick (abrasive blasting, scarifying, needl drawback of being extremely aggressive to the substrate. More suitable methods such as high and ultra-high-pressure water jetting are also covered, as well as low pressure water cleanin loose coating. Methods described that will *not* remove coatings or are not suitable for CMU or brick include detergent scrubbing, acid etching, grinding, shotblasting, scabbling, flame blasti

MPI ONLINE TRAINING

Powered by MPI

DOWNLOAD IMPORTANT NOTES IN PDF DOCUMENT

IMPORTANT NOTES - CONRETE MASONRY UNITS

DESCRIPTION OF THE SUBSTRATE

- Concrete masonry units (CMU's) are sometimes referred to as concrete block, cement block, cinder block or light-weight block.
- The block face can be smooth, split-face or scored.
- The blocks are cured from 14 – 30 days before they are shipped to a construction site.
- The blocks come in various shapes & sizes as well as various weights and densities.
- Regardless of the type or shape, new concrete blocks have a very porous surface that usually requires a block-filler as a primer.

ASSESSMENT & DSD LEVELS

Likely causes of coating failures on concrete masonry units:

- Moisture issues
- Moisture vapor – caused by humidity or temperature differences
- Construction issues – defective gutters, flashing, roofing, etc.
- Design and environment issues
- Too much paint – non-breathable systems
- Issues with clear coatings

Surface defects and flaws:

- Efflorescence – this is the highly alkaline white powdery substance that results when block & mortar joints are exposed to moisture or water infiltration over time.
- Mold & mildew – also caused by moisture. This must be removed prior to applying a repaint coating.

DSD 0 – ideal surface, a color or gloss change may be preferred
DSD 1 – slightly deteriorated coating on concrete masonry units
DSD 2 – moderately deteriorated coating on concrete masonry units
DSD 3 – severely deteriorated coating on concrete masonry units
DSD 4 – substrate damage to the concrete masonry units

COATING PRODUCTS & SYSTEMS

Considerations for choosing a coating:

- Location
- Type of block used
- Breathability of the existing coating and the new repaint system

Block Profile – smooth, split-faced, fluted, etc.

MPI ONLINE TRAINING

Powered by MPI

STUDY Q & A - QUESTIONS

Print Page

Questions - Concrete Masonry Units

1. Concrete masonry units are sometimes referred to as _____ block , cement block, _____ block or lightweight block.
2. Concrete masonry units can be smooth, _____, fluted, ribbed or scored.
3. The _____ of the block will have a significant effect on coating consumption.
4. Moisture vapor naturally moves from areas of _____ concentration to areas of _____ concentration.
5. Other sources of moisture in the CMUs include: water intrusion from wind-driven rain through pinholes; _____ caused by the building settling; anddefective g
6. When choosing a repaint system, the _____ of the existing coating(s) must be considered.
7. _____ systems are very good for aggressive environments.
8. In an interior situation, when a latex system has been specified, a/an _____ primer should be used on areas that have been prepped back to bare CMU surface.
9. Choosing the method of surface preparation for CMUs is dependent upon surface _____, defects and the _____ of DSD.
10. A pH level between ___ and ___ is acceptable for concrete masonry units.

System Review Questions - Concrete Masonry Units

1. What MPI # would you use if the system required is REX 4.2C G3 (for a topcoat)?
2. What MPI # would you use if the system required is REX 4.2A G5 (for a topcoat)?
3. What MPI # would you use as an intermediate coat if the system required is RIN 4.2E?
4. What MPI # would you use if the system required is RIN 4.2L G3?