

Painting concrete masonry

Paint can add color and texture to concrete masonry walls. It can reduce sound transmission and moisture penetration and help preserve the concrete masonry. Or it can constantly require maintenance itself. For painted concrete masonry to perform well, you must choose the right paint for the job and prepare the surface and apply the paint correctly.

Pigments and solvents

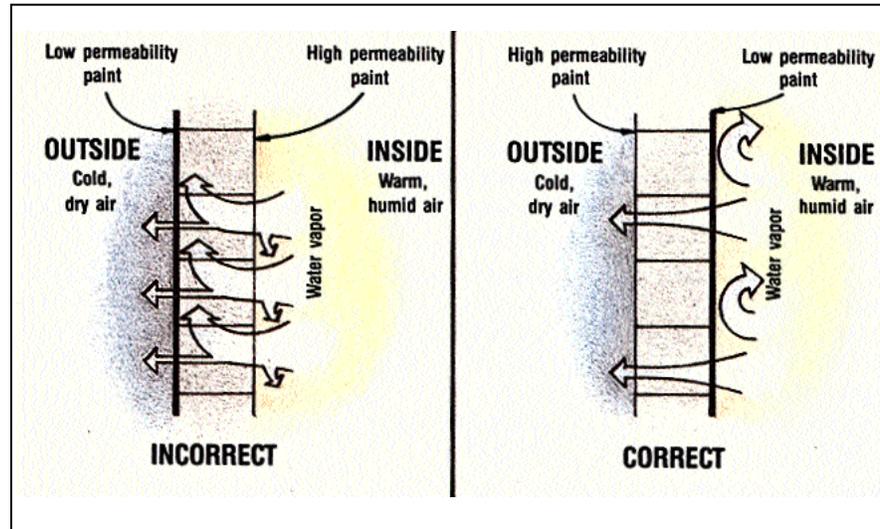
Paints are made from pigment particles suspended in a liquid medium. The pigment provides the color. The liquid medium, either a volatile solvent or thinner, supplies the desired consistency for application and bonds the pigment into a cohesive film as it dries. Paints dry and harden by evaporation of the solvent, by oxidation, or by hydration of cement.

Which type of paint should you use?

Latex, cement-, oil-, and rubber-based paints are commonly used on concrete masonry. Each type has its own properties and cost. Which one you use depends on your pocketbook and the application. The Portland Cement Association (PCA) suggests considering two things when selecting paints (Ref. 1):

- How will the paint be affected by alkalies (efflorescence)?
- How much surface preparation is necessary to apply the paint?

The choice also depends on whether the paint is used as a primer, first coat, or finish coat. To provide a smooth finish, use paints with fillers that fill the open block texture. Latex and portland cement-based paints are good fillers. If the natural texture of concrete masonry is desired, use latex or oil-based paints.



In a cold climate, use a paint on the inside of the wall that is less permeable to water vapor than the paint on the outside of the wall. If you don't, moisture that enters the wall through the interior paint will likely condense and freeze on the inside of the exterior paint, causing the exterior paint to peel.

In cold climates, always use a paint on the exterior that is more permeable to water vapor than the paint on the inside of the wall (Ref. 2). If you don't, moisture that enters the wall through the interior paint will likely condense and freeze inside the wall. The result: the exterior paint may peel (see drawing).

When to paint

Don't paint new concrete masonry walls before the time recommended by the paint manufacturer. Many painting failures are caused by moisture in the wall. During construction, moisture enters concrete masonry walls from rainwater, humidity, and mortar. If you paint the wall too soon, some paints will trap this moisture inside the wall. This trapped moisture can deteriorate the paint, and, if it freezes, it can cause spalling of the masonry.

Alkalies in the concrete masonry also can harm some paints. Waiting 6 months before painting and neutralizing the alkaline surface with a chemical pretreatment used to be the course of action. Paint manufacturers, however, have formulated paints that are not sensitive to moisture or alkalies. Some of these can be used on walls without delay. Manufacturers of others still recommend waiting 1 month before painting new masonry. For most buildings, painters don't get access to the site until after this time anyway.

Preparing the surface

For paint to adhere to concrete masonry, the masonry must be free of dirt, grease, oil, and efflorescence. Remove dirt and dust by air-blowing, brushing, scrubbing, or hosing. If the masonry is extremely dirty, use sandblasting or waterblasting. Remove

CHARACTERISTICS OF PAINTS FOR CONCRETE MASONRY						
Paint Type	Dry Film Thickness (mils)	Coverage (sf/gal)	Material Cost (¢/sf)	Dry to Touch (hrs)	Dry to Recoat (hrs)	Cleanup
Portland Cement						
Filler	5 to 10	50 to 80	3 to 5	1	12 to 24	Mineral
Topcoat	3 to 7	75 to 150	3 to 5	1	12 to 24	Spirits
Oil[†]						
Primer	1 to 3	200 to 300	4 to 6	4	24	Mineral
Topcoat	1 to 3	250 to 500				Spirits
Latex						
Filler	4 to 10	50 to 75	5 to 7	1	24	Soap & Water
Primer	2 to 3	150 to 300		1	3	
Topcoat	2 to 3	250 to 400		1	3	
Rubber						
Primer	2 to 10	75 to 250	5 to 9	4	24*	Special Solvents
Topcoat	2 to 5	200 to 350				

† Recommended for interior masonry walls only.
* May require as much as 7 days to cure.
Source: Various paint manufacturers and Ref. 4.

grease and oil by applying a 10% solution of caustic soda, trisodium phosphate, or detergents. Remove efflorescence by brushing or light sandblasting. After any chemical pretreatment, thoroughly wash the surface with clean water.

Applying the paint

The table indicates how thick each type of paint should be applied (the dried film thickness or DFT), how much coverage you get per gallon, the material cost per square foot, the dry-to-touch and dry-to-recoat times, and what should be used to clean up afterward. Although this information was obtained from several paint manufacturers, it is only a rough estimate. Paints vary considerably in price and properties. Always follow the paint manufacturer's application recommendations. A slight deviation from recommendations may decrease the durability of the coating.

Brush, roller, or spray?

Architects should specify how each coat of paint is to be applied: by brush, roller, or spray. Some paints should be applied only by a specific method; other methods may produce inferior results.

One coat or two?

If the paint is to serve as a protective coating, specify the minimum dry film thickness (DFT), which for a primer and finish coat is generally 5 mils (0.005 inch).

Remember also that several thin coats are better than a single thick coat. A single coat that produces the desired dry film thickness seldom results in perfect continuity. Misses or dirt can create small channels that draw in moisture and chemicals.

When to repaint

Every paint eventually wears away and must be repainted (Ref. 3). How

long before you repaint depends on what type of paint you use, how well you prepare the surface and apply the paint, and what the paint is exposed to. Because every job is different, the only way to know when to repaint is to inspect the painted masonry periodically.

Don't repaint too soon or too late—both increase painting costs. Repainting too often costs more and produces an excessively thick coating that may be brittle and prone to cracking and chipping. If you repaint too late, more work, time, and cost are needed to prepare the surface. For paint that's worn thin but still firmly bonded to the masonry, all that's needed is a simple dusting or washing. But paint that has cracked and peeled may have to be completely removed.

—by Bruce A. Suprenant

References

1. Randall, Frank, and William Panarese, *Concrete Masonry Handbook for Architects, Engineers, Builders*, Portland Cement Association, 5420 Old Orchard Road, Skokie, Illinois 60077.
2. "Maintenance of Concrete Masonry Walls," NCMA-TEK 44, National Concrete Masonry Association, 2302 Horsepen Road, Herndon, Virginia 22070.
3. Grimm, Clayford T., "Coatings for Brick Masonry," *Proceedings of the Second Canadian Masonry Symposium*, Carleton University, Ottawa, Ontario, Canada, June 1980.
4. Brevoort, Gordon H., and A. H. Roebuck, "1988 Paint and Coatings Selection and Cost Guide," *Materials Performance*, June 1988, National Association of Corrosion Engineers, P.O. Box 218340, Houston, Texas 77218.