

# CONCRETE *Information*

## Super Floors for Supermarkets

Improved visibility, reduced lighting requirements, high durability, and low maintenance—light reflective floors are well suited to large buildings, providing benefits to owners and occupants alike. On top of everything, the floors are attractive, too.

The WinCo Supermarket chain likes the advantages offered by white concrete floor surfaces. With several installations planned, WinCo has committed itself to placing light reflective floors in these new facilities. WinCo knew just what they wanted, and they found the team to do the work: a knowledgeable ready-mix supplier and an experienced concrete finisher.

### The Right Mix

Central Premix of Spokane, Washington, has four batch plants and about 75 trucks. According to their Quality Control Manager, Craig Matteson, they do quite a bit of stamped concrete for residential, small commercial, and discount retail stores, so they are attuned to the aesthetic side of concrete floor placements. Although the WinCo floors do not contain pigments, Central



*Figure 1. White concrete makes attractive flooring that stands up to heavy use—ideal for large buildings like supermarkets. (70110)*



*Figure 2. With the right concrete mix, an experienced crew can cover lots of ground quickly. The placing and finishing team relies heavily on the batch plant to provide them consistent concrete from one batch to the next. (70169)*



**Figures 3 and 4. For strikeoff and leveling, the finishing crew uses both advanced and simple tools, like laser screeds and wooden hand screeds, to complete their work quickly but with great accuracy. (70170, 70171)**

Premix's experience and comfort with colored concrete make them an excellent source for producing consistent white concrete.

Meidling Concrete is one of only three finishers approved to do the WinCo floors. Curt Meidling's expertise with finishing extends from basic to superflat floors, and it is obvious that he likes the distinction he has earned based on his skill for placing white concrete. As a team, Meidling and Central know what to expect of each other and have developed a level of trust that makes each job run smoother.

For the WinCo floors, the specification calls for a 4000-psi (28-MPa) mix. Based on test installations, it was decided that 90% white cement blended with 10% gray resulted in the preferred color. Mockups or samples are made well in advance of starting a project, then cured and viewed. This allows time to redo the sample if necessary, fine tuning the proportions of the fresh concrete or revising the construction methods (handling, placing, or curing).

With the higher fineness typical of white cement, the concrete has an added benefit of high early strength and a faster set. At three days, strengths typically reach about 3000 psi (20.7 MPa), with ultimate strengths coming in at 5000 psi to 6000 psi (34.5 MPa to 41.4 MPa). Even though it would be ideal to have no traffic during curing, the construction team recognizes the importance of a project timeline, and the quicker setting time and faster strength development make it possible for workers to return to the floor faster. At two days, light floor traffic is allowed, and by one week, trucks can use the surface.

Another consideration is the incorporation of admixtures. After much testing, Meidling prefers



**Figure 5. Because these floors are designed to be seen, no raveling is tolerated during saw cutting of joints. New slabs are generally wet cut the day after placement. (70172)**



**Figure 6. For consistent, lasting color throughout the entire depth, white fine and coarse aggregates are the best choice. (70173)**

using all mid-range water reducers in these floors. He has also found that a combination of mostly high-range water reducers with a little mid-range does an acceptable job. Normal-range water reducers are avoided, as they don't give the desired results with these materials and construction methods.

A good finisher can make the ready-mix producer's job much easier. For instance, Meidling insists that the roof be completely installed and free from leaks before he places a white concrete floor. Having a roof in place protects the floor from weather extremes, including water, sun, and wind damage, ensuring a trouble-free installation.

Wet cutting new slabs the following day is preferable as early cut saws can cause surface raveling with the chosen aggregates, mix design, and other aspects of these floors. (See Figure 5.)

## Lasting Color

The white concrete floor has a consistent color throughout its entire depth. Not only are the WinCo floors white when installed, the color does not fade or wear out. (See Figure 6.) By contrast, some proprietary dry-shake materials are formulated with non-white (fine) aggregates. As the paste on these surfaces wears away, aggregate particles that become exposed make a floor appear less white.

With periodic cleaning, WinCo floors will remain white as long as desired. However, the floor's appearance can be modified in the future in order to change its look. The floor's color can be changed by staining the surface. With grinding, a terrazzo-like appearance can be created.



**Figure 7. A walk-behind trowel increases the speed of finishing, and changing the metal blades for different passes ensures the floor surface will look its best. (70174)**

## Finishing the Surface

Two critical aspects of white concrete floors are finishing methods and timing. Finishers of white floors strictly observe their time frame. They absolutely do not place a trowel on the surface after a certain point for fear of damaging the color. Experience indicates that there's about a critical 15-minute window.

Though plastic tools are available, Meidling Concrete uses metal tools to finish the white surfaces. They change out the finish blades on walk-behind trowels for different passes. Machines are prohibited on the final pass, however, as hand finishing is key to good results. It requires extra finishers to get the job done right. Output is about 5000 ft<sup>2</sup> to 7000 ft<sup>2</sup> (465 m<sup>2</sup> to 650 m<sup>2</sup>) per day. With a large crew and a strong effort, it is possible to reach 10,000 ft<sup>2</sup> (929 m<sup>2</sup>). Production at this level, however, pushes the crew's abilities, even with 13 or 14 workers.

The floors are not water cured, but immediately following the final pass, a dissipating curing membrane is applied. Although this material is UV degradable, the in-place roof necessitates mechanical removal of the curing membrane before placing the floor in service. This can be accomplished by scrubbing the floor with detergent at the end of the



**Figure 8. Hand finishing on the final pass is key to good results. Even with metal tools, trowel burns can be prevented by proper timing. (70175)**

curing period. Soap and stripping compounds have both been used successfully.

White concrete floor surfaces represent the best in modern technology. On the other hand, these floors are reminiscent of an earlier era when pride in workmanship played a big role in achieving quality results. The finishers on the WinCo floors know they are among a select few who are properly trained to place this particular high-end concrete product. These skilled craftspeople enjoy what they do, are excited by it, and take pride in it. The difference shows. The owners know they're getting an excellent product well worth the premium they pay. In looking at one of these floors, it is easy to understand why. The floors look great, wear well, and save money in the long term.

Go to [www.cement.org/white](http://www.cement.org/white) for additional resources related to white cement concrete.



*Figure 9. A dissipating curing membrane is the preferred method of curing these white concrete floors. The membrane must be mechanically removed by scrubbing with detergent after curing is completed. (70176)*



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**An organization of cement companies to improve and extend the uses of portland cement and concrete through market development, engineering, research, education, and public affairs work.**

**WARNING:** Contact with wet (unhardened) concrete, mortar, cement, or cement mixtures can cause SKIN IRRITATION, SEVERE CHEMICAL BURNS (THIRD DEGREE), or SERIOUS EYE DAMAGE. Frequent exposure may be associated with irritant and/or allergic contact dermatitis. Wear waterproof gloves, a long-sleeved shirt, full-length trousers, and proper eye protection when working with these materials. If you have to stand in wet concrete, use waterproof boots that are high enough to keep concrete from flowing into them. Wash wet concrete, mortar, cement, or cement mixtures from your skin immediately. Flush eyes with clean water immediately after contact. Indirect contact through clothing can be as serious as direct contact, so promptly rinse out wet concrete, mortar, cement, or cement mixtures from clothing. Seek immediate medical attention if you have persistent or severe discomfort.

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