

Green Endurance

ARCHITECTURAL CONCRETE FLOORING™

SECTION 03 3300

FLATWORK GUIDELINES FOR GREEN ENDURANCE FLOORING

Edge Joints

- Use zip strips along all edges.

Sub grade (Recommend laser grading)

- To minimize cracking caused by restricting movement, care should be taken to tamp and fine grade the sub grade as flat as the finished concrete on the surface to insure uniform thickness and the least resistance to friction as the slab contracts and expands during thermal temperature changes. This will reduce the reflective cracking cause by differential sub grade restraints. This will also reduce surface defects caused by bleed water pooling in low spots on the vapor barrier during the plastic state and excessive water and trash rising to the surface during hydration stage causing surface blemishes that cannot be fixed by the Green Endurance Flooring installer.

Vapor Barrier

- An Under-Slab Vapor or Moisture Barrier should be used to prevent rising moisture from affecting your floors and maintaining a healthier establishment. Under-Slab Vapor Barrier material in 15 mil Polyethylene should be placed with the seams and penetrations taped before the concrete slab is poured and turned down in the footing.

Mix Design

- All concrete is to come from the same ready mix plant.
- Use same source and batch for cement, aggregates, and pozzolans throughout the job.
- Concrete Mixture shall be non-air entrained and Minimum 4,000 PSI or higher.
- Mix should be designed at a .45 water cement ratio
- The mix shall be designed as a total gradation mix with a minimum of three aggregates fine, intermediate, large
- Any admixtures, plasticizers, slag, fly ash or anything taking the place of Portland-based cement shall not exceed 20%. *NOTE A straight cement mix is recommended
- The cement shall be Portland cement type I conforming to ASTM C 150.
- Maintain concrete temperature below 85 degrees. Keep concrete cool and moist as long as possible. Decrease the rate of hydration and drying to minimize cracking.
- Architect must approve all mix designs.
- If integral color is used the minimum batch size should never be smaller than 3 cubic yards.
- Monitor and control incoming material consistency. Do not use calcium chloride based admixtures. Non-chloride admixtures may be used.

- Wash out all drums before loading. Ready-mix supplier shall maintain a 5" inch slump +/- 1/2". Obtain approval from Owner's Authorized Representative if slump is outside these parameters. Minimize driver added water to maintain a 5" slump at point of discharge with out compromising a .45 water content ratio.

Concrete Placement

- Place concrete with 5" slump at point of discharge, *strike off with laser screed, bull float 90 degrees to screeds pull direction, 10' check rod is preferred over the bull float, if not available the bull float shall be 6' in length or larger, smaller bull floats are to be used on sloped area's, vibrate & consolidate, level to the proper elevation.

Edges

- When placing edges use a 3' metal or wooden 2x 4 screed and run parallel with form or edge after initial screed and before floating.
- Hand floating shall be parallel to edge and done in 2' increments to avoid lifting or depressing edges. Do not reach out beyond 2' of edge with hand tools or float in a fan direction pulling excessive mud to the forms

Machine Floating

- Machine Floating with pans shall begin after placement when concretes psi is sufficient to operate with out causing excessive mortar or ridges and little or no bleed water is present.
- Slab shall be checked and re-straightened with 10' or larger highway straight edge or bump cutter to ensure FF's are met.

Machined Edges

- When using pans it is best to over run the formed edge by 5"
- Machined edges (walk behind) if walk behinds are used it is preferred to have pans for floating. The first pass along the edges shall be with the left side of the machine which is referred to as the cutting side. This will pull the high concrete away from the edges first. The second pass shall be on the right side of the machine which is referred to as the fill side to fill the low spots.
- Riding trowels are to be used in the same manner as the walk behind.
- The cut side of the machine is the rear
- The fill side of the machine is the front

Troweling

- Troweling shall begin after the surface has received a 2 pan float finish. Concrete finish floors shall have a 3 pass non burned steel troweled finish; the use of plastic trowel blades will help prevent burning the aggregate. The slab drying must proceed naturally and must not be hastened by the dusting on of dry cement or sand. Lightly tool or machine all edges at construction joints and exercise care that slab edges are not depressed or chattered along bulkheads, formed edges, columns, and pipes during finishing operations, particularly hand troweling.

Local Flatness/Levelness: The Random Traffic Floor shall conform to the following minimum F-number requirements:

Floor Flatness Number: F_F
 Specified Overall Value = **50**
 Minimum Local Value = **35**
 Floor Levelness Number: F_L
 Specified Overall Value = **30**
 Minimum Local Value = **20**

* Preferred strike off method: Somero S 240 Laser Screed or larger.

* If hand screed is used: Strike off with vibrating screed, using a rail system with set elevations, Slab must be bump cut with 10' or 12' Hwy straight edge during pan float finish in 2 directions to increase FF numbers and reduce wave index.

General Conformity to Design Grade: Except as set forth in Paragraph D below, the entire Random Traffic Floor shall fall within +/- 3/4" of its specified elevation.

Exceptions: Both the overall and minimum local FL levelness tolerances set forth in Local Flatness/Levelness above shall not apply to any Random Traffic Slab that is to be inclined or cambered. Likewise, no FL levelness tolerances will be applied to any unshored elevated construction. The general conformity to design grade tolerance set forth in General Conformity to Design Grade above will apply to unshored elevated slab constructions, but in all such cases, the tolerance will be increased to +/- 1-1/2".

FF/FL Testing: All floor flatness, levelness, and grade conformity tests shall be made (at the Owner's expense) on each newly installed Random Traffic Slab within 8 hours after completion of the final troweling operation. FF and FL tests shall be made by a factory certified technician in accordance with ASTM E1155 (latest revision) using an "F-Meter". Grade conformity tests shall be made using an optical or laser level. Results of all floor tolerance tests - including a formal notice of acceptance or rejection of the work - shall be provided to the Green Endurance Installer within 12 hours after testing. Failure to adhere to the testing and reporting requirements set forth in this paragraph shall constitute *de facto* acceptance of the work. NOTE: Weekends and holidays shall be ignored when computing specified testing and reporting deadlines.

Remedy for Out-of-Tolerance Work:

The entire Random Traffic Floor shall be subdivided into Minimum Local Floor Sections bounded either by the column and half-column lines, or the construction and control joints, whichever subdivision yields the smaller areas.

All Minimum Local Floor Sections measuring at or above the specified MLFF and MLFL numbers shall be accepted for F-number compliance as constructed. All Minimum Local Floor Sections which fail to meet or exceed both specified minimum local F-numbers shall be removed and replaced (in the case of slabs-on-grade), or ground and/or retopped (in the case of elevated slabs). No remedies for defective Minimum Local Floor Sections other than removal and replacement of slabs-on-grade, and grinding and/or retopping of elevated slabs will be permitted.

If the entire Random Traffic Floor, when completed, fails to meet or exceed both the specified OAFF-number and OAFL-number, then the contractor shall rebate to the owner an amount equal to:

$\$1.00 \times (\text{aggregate sq. ft. measuring below Specified OAFF}) * \\ (\text{Specified OAFF} / \text{Measured OAFF})$

Or

$\$1.00 \times (\text{aggregate sq. ft. measuring below Specified OAFL}) * \\ (\text{Specified OAFL} / \text{Measured OAFL})$

Whichever is the greater amount.

Finish needs to be uniform in color and levelness with no trowel marks, foot prints or depressions from hand tools, knee board ECT... Concrete to be placed in accordance with ACI 302 1R 04 Class 5 floor Concrete to be finished in accordance with ACI 117

Floor shall be tested in accordance with ASTM E 1155 The Green Endurance Flooring Installer shall be included in distribution of reports and receive one copy of the FF/FL test results within 12 days of actual testing.

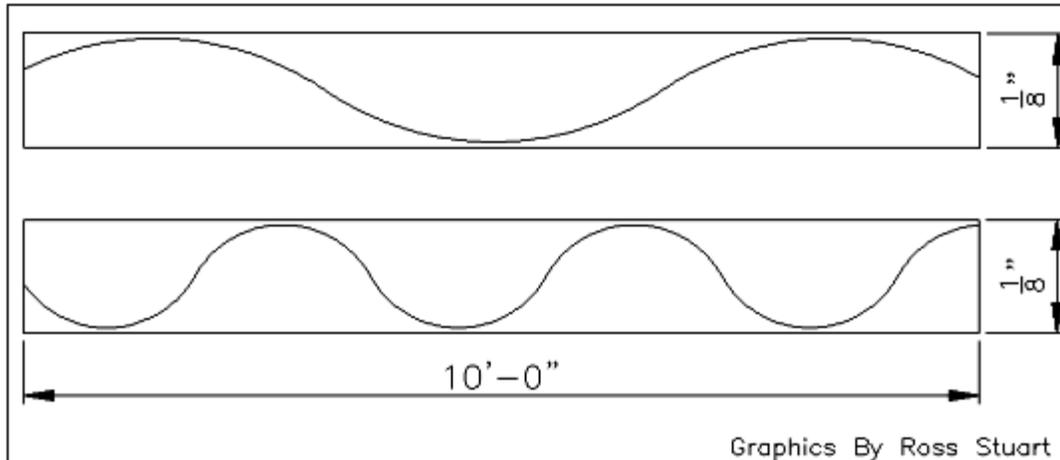


FIGURE 1

Figure 1 shows the wave index of a slab, both are within a 1/8" in 10' therefore the ACI 117 and ASTM E1155 must be adhered to for slabs receiving Green Endurance Flooring.

Saw Cutting

Based on independent studies we recommend saw cutting with Soff Cut saw ASAP without raveling edges or dislodging aggregates. We recommend the following based on slab thickness to help minimize slab curling and panel cracking.

- 4" thick to be cut at 10' OC EW
- 6" thick to be cut at 12' OC EW
- 8" thick to be cut at 15' OC EW

* All re-entrant corners should have rebar inset & be cut 50% of the slab depth to reduce cracks from internal pressure

Panels should be kept as square as possible and should be approved by architect.

Curing

- Wet curing is preferred to dam exterior edges and flood slab or run sprinkler hoses to overlap so slab has no dry spots, but if this cannot be achieved, the use of blankets is preferred; blankets must be pulled no less than 5 days before Green Endurance Flooring installation, if this is not possible use a dissipating or water based cure and seal. Do not use a densifier/hardener material or any kind of poly material.
- Concrete shall be cured a minimum of 28 days before Green Endurance Flooring installation can take place.
- Application shall take place prior to fixture and trim installation and/or substantial completion.