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General Specifications – Concrete Floors

Design

In most applications, when loads are moving on air bearings, the unit floor loading is very low compared to conventional wheeled traffic, or loading which results when the air is turned off and the air bearing platform comes to rest on its skid pads. This, floor slab design must usually be based on soil load bearing capacity and requirements for other wheeled traffic or loads expected to be placed on the floor. Local conditions and requirements vary so greatly, that new floors should be designed individually for each application.

Recommendation: Design floor thickness and reinforcement to withstand the most severe expected loading, and for actual soil loading capacity. If possible, avoid expansion joints in path of air bearing movement.

Flatness and Levelness

Air bearing equipment needs flat and level floors for best operation for three reasons. First, any slopes add to the force needed to move or guide the equipment. Second, floor undulations can exceed bearing lift and equipment can “run aground” or hang up on raised portions of uneven floors. This is normally a problem only with very large equipment. Third, when air bearings are deflated, the frame or landing pads contact the floor. If the load is very large, heavy and rigid, floor loading can be extremely high on raised portions of the floor.

On a flat, level and smooth floor, the force required to move air bearing equipment is very low, often in the range of 1 to 5 pounds per 1,000 pounds of weight (.5 to .1% friction). With this low friction, even a small amount of floor slope greatly affects moving force and guiding effort. For example, a slope of ½” in 10 feet requires an added force of 4 pounds per 1,000 pounds of load.

A floor can be generally level over its entire area, but have local undulations that greatly affect movement. For example, a load depression of on ¼” in 3 feet can add 7 pounds of moving force per 1,000 pounds, for the bearing or bearings moving in the depression.

Recommendation: Two different tolerances are suggested. Select one according to the manner of use:

- A. For light loads, large bearings, or powered movement: floors should be flat with no more than 1/4" deviation from a 10 foot straight edge laid on the surface, and the straight edge should lie level within 1/4".
- B. For heavy loads, smaller bearings, and manual movement: the above 1/4" deviation should be reduced to only 1/8" for both flatness and levelness.

Smoothness

Air bearings operate with a very thin air film between the diaphragm and floor. Even minute floor projections that are on greater than a few thousandths of an inch high, can cause increased drag and air consumption.

Recommendation: Finish floors with powered steel trowel for a dense, smooth, flat floor. Continue successive troweling passes until surface becomes polished. Number of trowelings will vary with mix and weather conditions. Following troweling operation, a sprayable concrete sealer should be applied to the floor to prevent dusting.

Expansion Joints

Recommendations: Expansion joints should be minimized in the path of air bearing movement. When their use is unavoidable to prevent floor cracking, make certain that reinforcing bars are carried through across the joint to minimize slab movement. Fill with flexible epoxy crack filler.

Disclaimer: This document covers only general specifications for concrete floors. Specific types of equipment; processes; sizes of, quantity and spacing of air bearings; may dictate more specific requirements. Please contact an Airfloat, LLC. representative for review of specific requirements. Airfloat, LLC. is not a flooring expert. New floor installation processes, coatings & refinishing processes are constantly being developed. It is the customer's responsibility to choose a floor contractor who can meet the above specifications and provide a floor that will be economical, durable and maintainable.