



## Floor Specifications for Air Powered Equipment

### Introduction

A good, solid, flat and level floor surface is of paramount importance for operating any pneumatic powered, air bearing load moving system at optimum performance. A floor surface that is porous, and has imperfections such as cracks, splits, cavities, dimples, gouges, vertical projections, steps in plane, and other such defects will almost certainly cause the equipment to operate with far less performance than it was designed for.

The general rule of thumb for any floor surface - concrete, wood, vinyl, metal sheet - is that it should be level to +/- 6mm within 3 metres - with all vertical projections ground down to a flatness degree +/- 3mm over a 3 metre length, and all cracks, holes and other porous imperfections filled with suitable epoxy filler and sealed to a non-porous state. See page 7.

By following the recommendations in this guide you will ensure that your load moving equipment will always operate at its optimum performance.

### Overview - Types of Floor Surface

▶ **Solid concrete - non-porous, with smooth, steel-trowel finish**

This is the ideal floor surface for any Rotair Systems load moving products. Being concrete ensures that there is no surface flexing or give at any areas of the load's travel. Imperfections and defects are easily corrected, and the floor's longevity is usually very favorable. More information on pages 2 & 3.

▶ **Polished wood floors - sealed**

Polished wood floors are usually quite acceptable for our load moving systems. As most wooden floors are of the tongue & groove variety, they rarely present problems with cracks and cavities, and other defects. Flexing of the floor could cause problems, however. More information on pages 4 & 6.

▶ **Vinyl, linoleum and other non-porous materials - all material to be non-embossed**

These materials are also suitable as a surface for operating any Rotair Systems products. This material is not likely to be found in many industrial premises, however. If it is the floor surface of choice, then be sure to read the advisories on polished wood floors on pages 4 & 6.

▶ **Purpose-laid metal sheeting cover**

At such times when a heavy load is required to travel across a surface that is not suitable for normal load moving system operations, it is suggested that a series of metal sheets be laid in the load's travel path. If this method is adopted, the ground surface of the load's travel path should be flat, level and solid - see page 2. Such ground could be rough concrete, black-top asphalt, rough wooden floor etc. More information on page 5.

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### Industrial Concrete Floors

#### New Concrete Floor Construction

- ▶ **Concrete Quality:** The concrete should be of such a mixture to ensure the minimum of shrinkage and cracking. Hairline cracks will not usually affect the performance of your Rotair Systems equipment. However, all cracks are susceptible to more shrinkage and increased widening, so it is of paramount importance to construct your floor with a concrete mixture that has minimal shrinkage properties. The quality of the concrete should offer durability and longevity to sustain high quality load moving operations. It is recommended that the floor surface be sealed with an Epoxy Concrete Sealer.
- ▶ **Top Surface:** The top or skim surface should be a trowel-smooth, non-porous finish. The top surface should have a smooth, flat uniform appearance throughout. All trowel marks, ridges and valleys should be corrected before concrete is allowed to set.
- ▶ **Level:** The finished top surface will be a true plane +/- 6mm within 3 metres, as determined by a 3-metre straight edge placed anywhere on the slab in any direction.
- ▶ **Flatness:** In addition to being level - see above - all floor surfaces should be as flat as possible. Flatness means any undulations and/or vertical projections in the floor surface. The degree of flatness in your floor's surface should be +/- 3mm over a 3 metre length.
- ▶ **Expansion & Construction Joints:** If at all possible, the use of expansion joints should be avoided on floor surfaces that will be part of a load moving system travel path. Expansion joints are usually of a high degree of porosity and cause the air bearings of these systems to falter and exhaust their air, thus breaking the continuity of the operation. If constructing your floor without the use of expansion joints is not an option, then the joints should be keyed, filled with a backer rod, and finished to match the rest of the floor's surface. The expansion joints will still be effective for their designed purpose, but the floor surface has also been made suitable for use with pneumatic powered load moving systems.

#### Existing Concrete Floor Surfaces

- ▶ **Cracks, Cavities & Holes:** All cracks, cavities and holes in the floor's surface should be filled with a suitable epoxy filler with non-porous, non-shrinking properties. Ensure that the cracks are free of loose dust and debris, and cleaned ready for filling. Fill each cavity as per the filler manufacturer's instructions and leave proud. When set and suitably cured, sand the filler level with the floor surface.
- ▶ **Minor Cracks:** Minor cracks and deviations can be sealed using heavy duty sealing tape. However, if the cracks are in a regularly used travel path, then it is recommended they be filled and sealed properly.
- ▶ **Surface Projections:** All surface projections and other obstructions above the surface of the floor should be ground down to match the rest of the floor surface. This is important as vertical projections could damage the fabric of an air bearing diaphragm and cause damage to the system.

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## Air Powered Load Moving Equipment

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### Existing Concrete Floor Surfaces

- ▶ **Floor Sealing:** Rotair Systems recommends that all floor surfaces should be sealed with an Epoxy Concrete Sealer to ensure a non-porous surface that is specially suitable for Rotair Systems load moving products.
- ▶ **Sealing Repairs:** All cracks, cavities and deviations should be repaired before applying the sealer to the surface. Should the floor surface need further repairs after the sealer has been applied, then it is recommended that the repaired areas should have a further sealer application.
- ▶ **Repairing Cracks and Cavities:** When repairing cracks and cavities, ensure that the cavity has been sufficiently enlarged to provide a good keying edge and sufficient depth to ensure that the filler can bond correctly with the concrete. Filling a cavity with flaky edges and shallow depths will eventually cause the filler to loosen and fall out of the cavity. Always enlarge the cavity to ensure a good fill area and keying surface. This is important because as the load moving system passes over the repairs, each air bearing will be exhausting out pressurized air from its diaphragm. A good quality, bonded and sealed repair should not be affected by this exhaust. A poor repair will cause the sealer to loosen.
- ▶ **Surface Steps:** Rotair Systems load moving products are able to handle slight steps in the floor's surface. Slight steps must be blended between levels by grinding down to a smooth gradual ramp which will allow the system to move from one level to the next with minimal gradient. More pronounced steps in floor level must be ground down over a larger area to allow the system to traverse the increase or decrease in level in a smooth unobstructed manner.  
See diagram on page 5.

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### Polished Wood Floors

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Polished wood floors are an alternative to concrete floors, although wood floors are not often found in today's industrial environments. If you have no alternative than to use a polished wood floor, then the following information should be considered.

- ▶ **Floor Surface:** The floor's surface should be flat, smooth, non-porous and sealed to allow the equipment to operate at optimum performance.
- ▶ **Floor Joints:** Most polished wood floors use some sort of tongue and groove system to secure the floor planks to each other. This usually provides a suitable, non-porous joint in the floor's surface, and is suitable for Rotair Systems load moving systems to operate on. However, if your floor does not have a tongue and groove style system, it is essential that all floor joints be butted together and sealed. Some wood floors may necessitate the use of spacers between joints. If this is the case, then the tops of the spacers need to be keyed out and filled with a non-porous, non-shrink filler, and sealed.
- ▶ **Floor Flexing:** Virtually all hardwood floors will have a certain amount of flexing and give because of their structural properties. Hardwood floors are usually constructed over a series of joists which will support the floor and any weight placed upon it. Under normal usage, this type of floor does not flex or move in any way. However, if a heavy load is passed over the floor, then there is the possibility that the floor and its supporting joists may flex and cause the floor surface to deviate from level. This would cause the load moving equipment to falter and lose efficiency, and may even stop altogether. If flexing does occur and the floor is going to be in regular use for load moving operations, then you may have to strengthen the floor and its support structure. Flexing tolerance should not exceed +/- 3mm within 3 metres. See diagram on page 6.

### Vinyl, Linoleum and Other Non-Porous Materials

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Non-embossed Vinyl and Linoleum are another alternative to concrete floors. Although rarely found in industrial environments, they can be used as a suitable surface equipment. Consider the following information.

- ▶ Ensure that the surface is non-embossed, flat and level with no ridges, bumps or other obstructions.
- ▶ Butt all edges of the vinyl or linoleum together tightly and seal with heavy duty sealing tape.
- ▶ Repair all tears, cracks and other imperfections in the floor surface before use.
- ▶ Apply the same Floor Flexing advisory as in Polished Wood Floors - above. See diagram on page 6.

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## Air Powered Load Moving Equipment

### Purpose-Laid Sheet Metal Cover

Not all floor surfaces can be of the smooth, flat, non-porous, concrete type. Many times we encounter ground surfaces that are solid but just not suitable for our load moving systems. Such surfaces could be very porous, thus allowing operating air to escape through the surface causing little or no operating efficiency of the system. It could also be that the ground surface, although flat and level, may be just too rough or porous for the equipment.

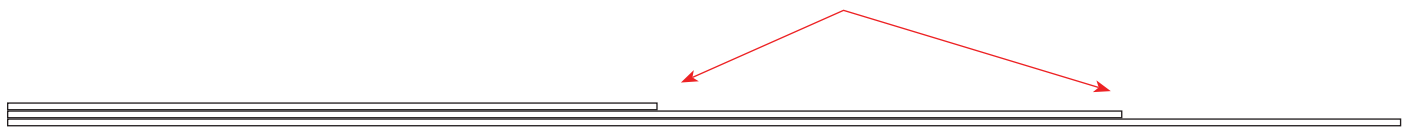
In such cases of unsuitable ground or floor surfaces, it is possible to use a sheet metal covering or plate for the equipment to travel along. The metal covering would not need to be placed under the complete load's footprint - just the travel path of each air bearing supporting the load. It is important to remember that all steps should go downward and not upward. The load should always STEP DOWN wherever possible.

Here is a diagram of how the sheet metal should be placed.

Direction of load travel

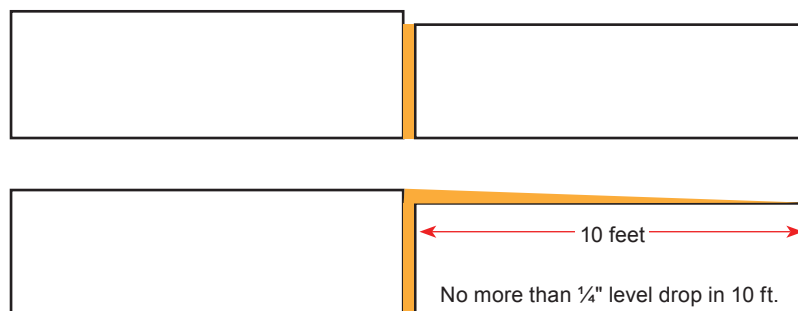


Seal overlapping steps with suitable sealing tape



### Stepping

The top diagram shows an example of a butted step. This will cause the system to falter or stop altogether. The step should be broadly filled and ground to the approximate profile of the lower diagram.



Consult your dealer for assistance in floor preparation and level changes.

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### Floor Flexing

As mentioned in the advisory for Polished Wood Floors, floor flexing is a possibility when a heavy load travels over it. Wood floors, under normal foot traffic use, do not usually move, but when they are subjected to a heavy load moving across them, the weight of the load might cause the joists and other structural beams to flex slightly and cause a deviation in the floor's surface area.

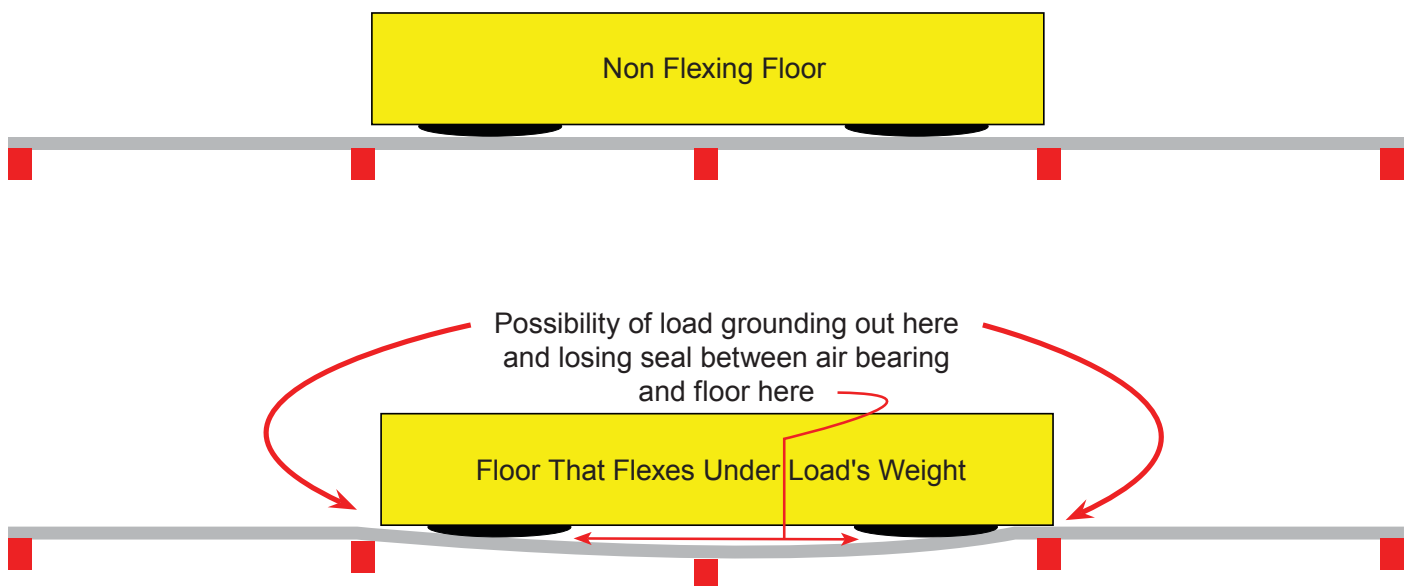
Slight flexing and deviations of less than 6mm should not present any problem to a Rotair Systems load moving product as it moves across the floor. However, if the deviation is more than +/- 3mm within a 3 metre run, then there is the likelihood of the load faltering or grounding on the higher level - depending on the size air bearings being used.

### Considerations

- ▶ Frequency of movements across this floor area.

**Frequent Floor Movements:** If the floor is to be used regularly for load moving use, then strengthening the floor would be a good option and would ensure your load moving system operates efficiently.

**One-Off Type Movement:** If this is a one-off type of movement, it might be an idea to consider a cheaper and more cost-effective alternative. Such an alternative could be the laying of steel plates or other strong material in the travel path of the load. Such material would help to spread the load's weight over a larger area and help to keep flexing to a bare minimum.



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### Porosity

Surface texture - especially smoothness and porosity - is probably the most important aspect of the floor surface when considering the purchase of pneumatic powered load moving equipment. When such a system is in operation, the air pressure being exhausted from the air bearings powers down onto the floor's surface, to cause flotation to take place and lift the load off the floor. If you have a porous or "leaky" floor surface, much of that air will escape and go to waste, thus causing the equipment to fail to reach the correct state of flotation, and lose much of its efficiency.

All operating surfaces for this type of equipment should be non-porous and able to withstand the air pressure exhausted from the equipment.

### All Floor Surfaces

#### Safety Notes:

Whichever floor surfaces you are planning to use for your Rotair Systems load moving equipment, it should be remembered that any load, regardless of its weight, shape and size, will try to move via gravitational drift when it has been placed in a flotation state by the equipment.

If your floor surfaces are not reasonably level, then it is of paramount importance that all operators and assistants are aware that the load will move as soon as it has reached flotation state. Do have plenty of assistants on hand to ensure that the load is restrained at the time of flotation.

If you are unsure of your facility's floor surfaces and would like help in determining their suitability for operating Rotair Systems products, please do not hesitate to contact us.

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