Installation Instruction for HKFloors Vinyl Floor Tile

A. General Subfloor Preparation

Subfloor preparationmust be checked and applied for HKFloor's whole items.
Subfloor condition must be checked and prepared to suitable condition for every floor covering. The flooring contractor has responsibility for floor covering only the subfloor condition is suitable condition to install the floor coverings. The local regulations regarding subfloors and the floorcovering installation must be complied with.

A.1. Subfloor preparation prior to tile installation

The subfloor must be absolutely level, dry, hard, smooth and structurally sound. It must be free of cracks and other irregularities and must not be contaminated with paint, plaster, oil, grease or any other substance which could affect adhesion. Cracks must be filled with an appropriate material.

Old Floor covering

- **Vinyl/Rubber floor coverings:** Old vinyl, Linoleum and rubber floor coverings should always be removed and the subfloor be examined and prepared as necessary before installing new floorings.
- **Ceramic tiles:** Any loose ceramic tiles must be stuck down and any traces of paint, plaster, grease, etc, must be removed. The cleaned tiles must be primed with an appropriate primer prior to applying a smooth compound fully in accordance with manufacturer's instructions. Leave to dry then rub down to a smooth finish. Sweep thoroughly. Apply the adhesive in accordance with manufacturers instructions.
- **Wooden floor boards:** Check the condition of the floor boards, secure any loose boards. Any holes like knotholes must be filled as necessary. Cover with hardboard, chipboard or plywood, minimum thickness 8.0mm.
- **Old Capet :** Remove, clean the subfloor and apply a smoothing compound.
- **Epoxy / Urethane Coating :** Due to the strong gas evaporation, at least one-year time must be passed after coating application. Proper epoxy or urethane rubber adhesive should be apllied.

Hardness

Use cement based products for the subfloor preparation. They must be neither crumbly nor flaky.

Flatness

Surface state must be fine and regular. Maximum variation must be within 3.0mm / 3 meter square.

Dryness

- The subfloor must be permanently dry and must be suitable condition for vinyl floor covering. If not, proper water proofing/anti-moisture application must be applied prior to floorcovering.
- A damp-proof membrane must be laid under the concrete to act as a waterproof barrier against under-laying hydrostatic pressure and moisture**.**
- Moisture content must be measured using appropriate devices and should meet the relevant standards in each country.
  a. Under 5.0 LBS per 1,000sqft in 24 hours according to Calcium Chloride Moisture test; ASTM E 1907/ASTM F 1869.
  b. Under 2.5% according to CM method. (Without floor heating)
  c. Under 75% relative humidity according to the hygrometer method referred to in BS 8203
- Normal concrete mixing and screed laying must be properly dried. It requires 1day for 1.0mm deep concrete (e.g, 1 month for 25 mm deep concrete). This is considered for screed thicknesses up to 50mm.

=> This drying time condition may differed according to the temperature, humility and dampness of concrete.

Smoothness

Smoothing compound are recommended to be applied to the entire floor surface according to the standards mentioned above. It must be allowed to dry in accordance with the manufacturer's instruction.

Apply Carborundum stone for perfectly smooth surface and sweep or vacuum up any dust.

Underfloor heating

The heating system should have been switched on at least 4 weeks before floor covering, then turned off 24 hours before any subfloor preparation and remains during installation of floorcovering. The heating system should then be switched on 48 hours after installation of flooring and the temperature progressively adjusted to normal working temperature over 5-7 days. (Floor temperature; < 28℃)

The suitable adhesive must be applied for underfloor heating system floor covering.

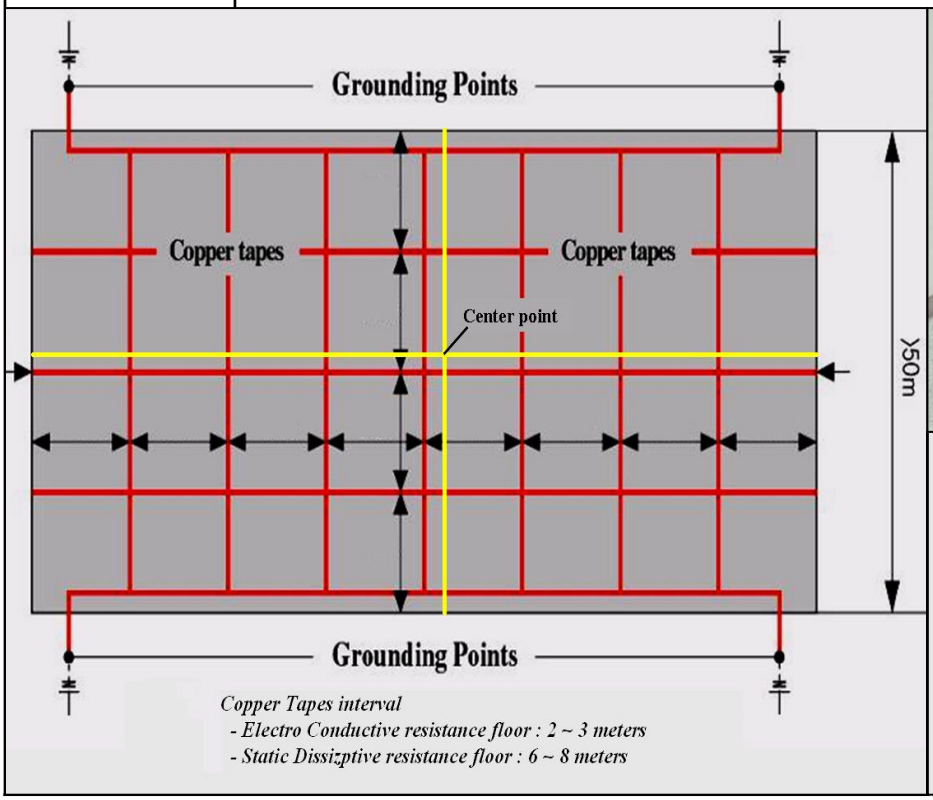
PH Level

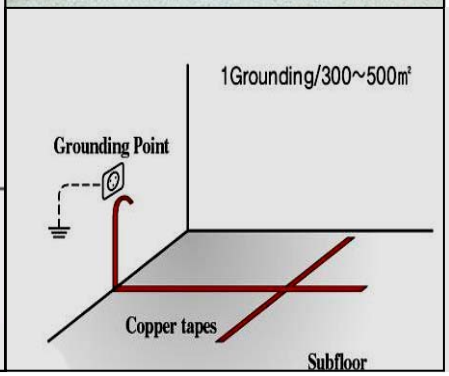
It should be under 10.


Raian Prime LE / Elite Pro / Elite / Econo ESD vinyl tile

• For the proper ESD control vinyl floor covering, Copper strip must be installed prior to ESD tile installation to make the grounding connection.

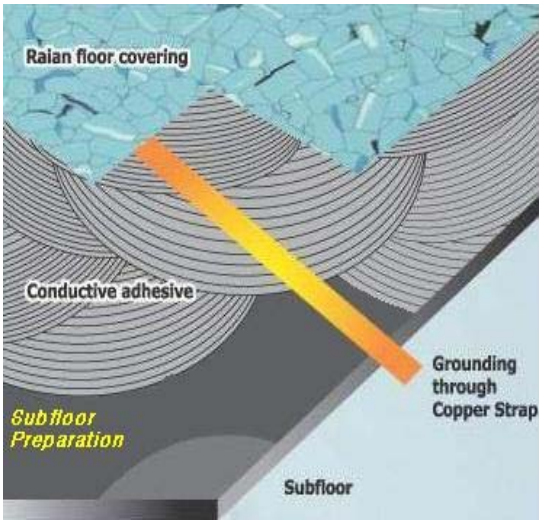
Procedures	Details
Setting the points for grounding connection and installing the copper lines.	1. Set the grounding connection points. Every 300 ~ 500m2 area require 1 grounding connection. If it is independently separated area from main area (e.g. rooms, corridors), separated grounding should be connected. 2., Along the long length wall, install the first copper line on the point from 1/2 tile size length apart from the center lines. (e.g. 610mm size tile – 310mm apart). Install the copper tapes lines according to the interval standard of floor electric resistance requirements. (EC; 2~3m / SD;6~8m interval) 3. Install pointing copper tape lines on the point from 1/2 tile size length apart from the center lines latticed . Leave 1~2meter copper tape for grounding connection later. 4. Crossing Points of copper tape line should be puncher in 3mm diameter to secure The connection.. 5. Final grounding connection to the ground points must be performed by authorized electrician or engineer.

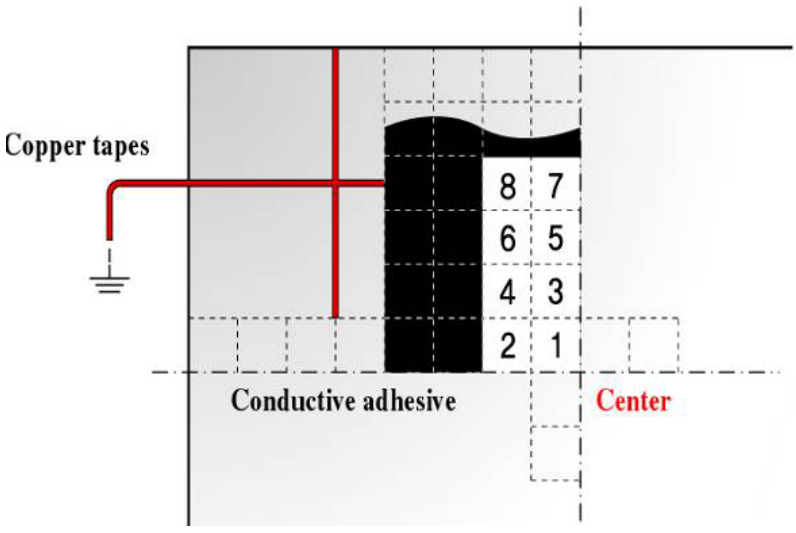


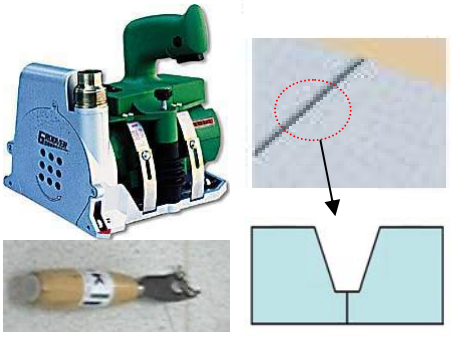
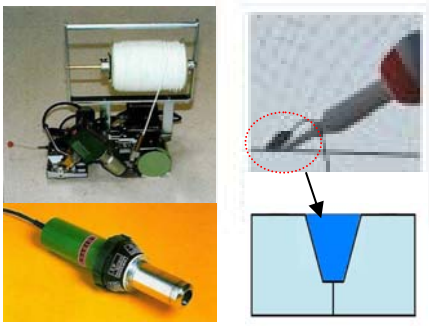
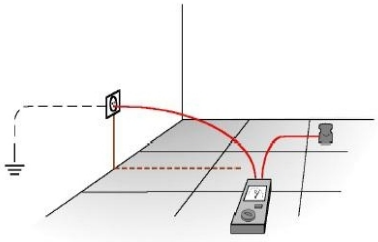


Procedures	Details
Adhesive Application	1. Adhesive application for ESD vinyl floor covering is same as usual adhesive application. However, suitable adhesive must be consulted and selected by the authorized personnel who manage the job site conditions. 2. EC adhesive choices for Raian ESD vinyl floor - EP-75 : 2 component environment friendly EC epoxy adhesive - UC-510 : 1 component solvent based EC urethane rubber adhesive - WECA I : Water based fiber mixed EC acryl adhesive - WECA II : Water based carbon mixed EC acryl adhesive
Tile Installation	1. Tile installation for ESD vinyl floor covering is same as usual square type tile application. However, be careful on the combined installation on copper tape lines and EC adhesive application.

Items	Moisture resistance	Bonding Strength	Flammable	Solvent odor	Color	Spillage Cleaning	Price	Ohm(Ω) Stability
EP-75	O	High	X	X	Gray	Hard	High	Good
UC-510	O	High	O	O	Black	Hard	Middle	Good
WECA I	X	Good	X	X	Gray	Easy	Middle	Middle
WECA II	X	Middle	X	X	Black	Middle	Middle	Good





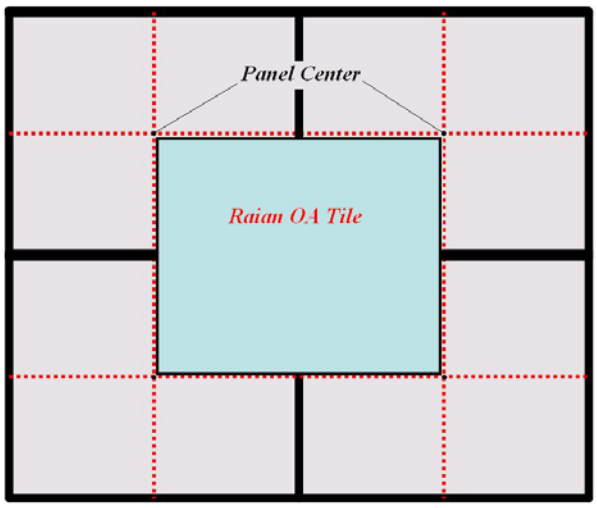
Procedures	Details
Grooving & Heat Welding	1. Seamless floor covering can be applied on Raian ESD vinyl floor covering to prevent moisture troubles and reduce the dust & particle rising from the floor. 2. Grooving can be done using electric grooving tools or hand grooving tools. About 70% - 80% depth comparing to original homogeneous tile thickness should be grooved. (e.g, 2.0mm thickness tile – 1.4~1.5mm / 3.0mm thickness – 2.1~2.3mm)  **[Grooving]**  **[Seamless welding]** 3. Using electric welding tools (automatic or manual), weld welding rod to the grooved space. *** Important note : Engineer must wear proper protective equipments as 400~450℃ high temperature will be used. It also may damage the tile surface without proper attention.** 4. Trim off part of excess welding rod with the crescent-shape knife with trimming slide while it is still warm. Crescent bladed knife with a trimming slide is necessary to prevent tile surface damage during trimming work. Trim fully cold remaining excess flush on the tile surface using a sharp crescent-shape knife. Installing set-in coved skirting with a welded joint must be done for EN E3 classification. 
Surface & Volume Resistance Test	After Pressure rolling and Construction end cleaning procedures, electrical resistance tests according to approved relevant standards should be tested. First random points measurements can be made after 24 hours. Electrical resistance readings may be out of range than specified if adhesive is not dried enough. Tests is recommended after 14 days later after installation. 

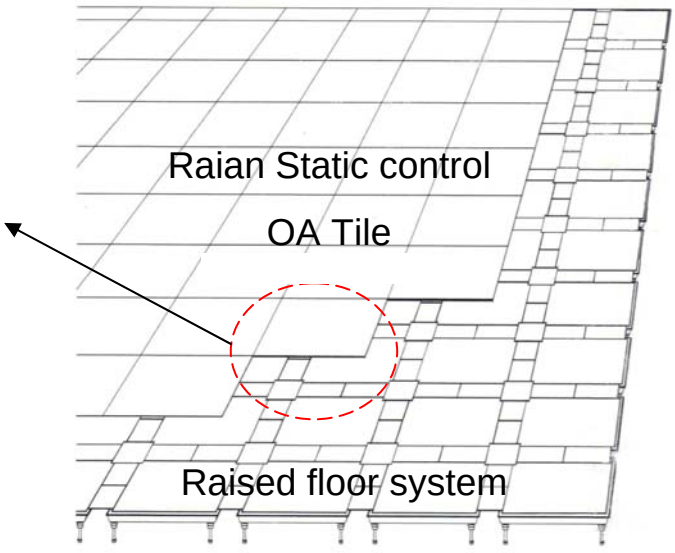
RAIAN Anti-static Carpet OA tile / Mable Anti-static OA tile / Axion SD OA tile

1. Installation on Raised floor system

For the future cable management system requirement, adhesive selection must be consulted properly. (Releasable adhesive / double side adhesive tape (>5.0cm width))

Procedures	Details
Checking Subfloor conditions & OA tile installation	1. Panel leveling condition should be under ±1.0mm in 3 meter distance. Distance between each panel should be under ±2.0mm. 2. Mark the center of the room (cross-hair) and make the marking lines to make half overlapped, at least 7 cm distances, between tiles and raised floor panel joints. 3. Apply releasable pressure sensitive adhesive or double side adhesive tape. Keep proper open time recommended by adhesive manufacturer. 4. Install HK Raian OA tile in accordance with the marking lines. - Tiles must be installed followed by arrow direction printed on their reverse side. - Start installation from the center point. **SAME LOT** tile must be installed in same area. - Leave 1.0mm distance between each pieces of tile for easy floor maintenance. 5. If small cut part should be installed to verge and doorway areas, apply strict 90° vertical cutting with several hand cut swings. 6. Apply proper pressure rolling finishing after tile installation. 8. Construct the wiring like electric outlets, if needed. 9. Never apply normal wax but only proper ESD wax, if wax application is required.

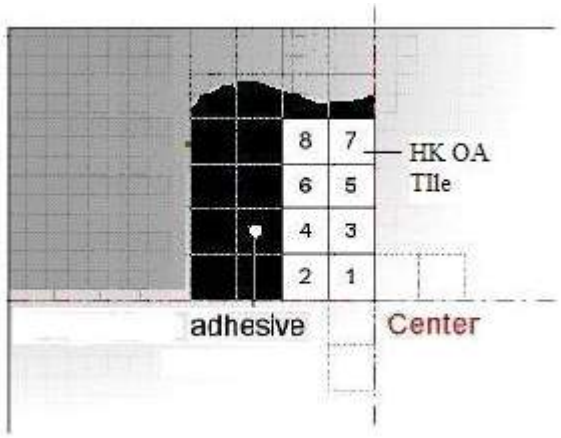


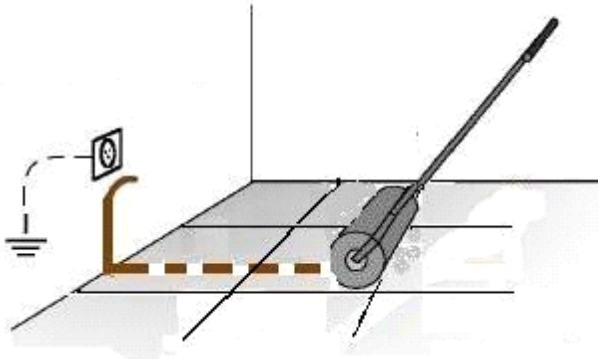


2. Installation on Solid subfloor like Concrete Cement

For the direct installation on solid subfloor like concrete cement, follow the installation instruction of DeArt Stoney or Impression. (Commercial vinyl square type tiles).

According to the cable management system requirement, adhesive selection must be consulted properly. (Permanent type / Releasable type including double side adhesive tape)





D. Important Notes

1) Prior to Installation

① Subfloor coition preparation & management for floor covering is one of key points of successful floor covering.
② Moisture, Hardness, flatness, temperature, cleanness, smoothness and ph level must be properly controlled prior to floor covering.
③ Old floor covering and other contaminating materials must be removed. Crack must be filled with proper filling materials.
④ Proper installation tools with personal protective equipment should be equipped.
⑤ Well trained authorized installation engineers should manage whole floor covering instillation processes.
⑥ Floor covering materials with accessories should be consulted with proper authorized personnel and selected according to installation site conditions.
⑦ HKFloors warrantee is valid only when floor covering is applied using HKFloor's flooring materials.

2) During Installation

① Proper adhesive selection and usage is one of key points of successful floor covering.
② Apply proper open time. Be careful on fire and proper air circulation.
③ Adhesive spillage should be managed properly and contamination must be cleaned immediately.

3) After installation.

① Newly covered floor surface should be protected and managed from possible contamination of construction site.
② If heavy objects are moved or handled, cover the floor tile with proper protective materials.
③ Floor finish chemical should be consulted by proper authorized personnel before its usage.
④ Apply enough time to stable condition for traffic

4) Installation Trouble shooting

Defects	Cause & Phenomenon		Solutions
Migration	Subfloor Cleaning	◆ Oil, paint, Colored liquid, chemicals on the subfloor migrates to the floor coverings. ◆ Discoloration, Material Damage or deformation.	➢ Grinding-down method. ➢ Burning-out method ➢ Special sealing tape covering method. => Manage properly the possible contamination materials.
	After installation during normal usage	◆ Rubber or contacting materials of Facilities, furniture and heavy load materials may migrate to the floor covering and cause Discoloration, Material Damage or deformation. ◆ Coffee, Dying chemical, medical liquid, Strong chemical may cause Discoloration, Material Damage or deformation.	➢ Seal the contacting points using proper materials. ➢ Strong chemical liquid must be removed immediately.
Wave	Moisture	◆ Moisture can melt the adhesive and floor tile can be detached form the subfloor or air / gas can be gathered underneath the floor covering resulting tile detachedness, deformation.	➢ Moisture controlling must be checked and done properly. (under 4.5%)
	Subfloor Crack	◆ Subfloor must be sound and hard enough for floor covering with proper temperature maintenance. During adhesive drying process, adhesive dry film shrinks and it may cause the soft subfloor crack resulting possible tile detachedness, deformation.	➢ Crack or soft part on subfloor must be managed before floorcovering installation..
	Subfloor flatness	◆ Flatness control failure causes tile expansion or shrinkage.	➢ Grind down high part and fill the low part with proper filling material. Apply Leveling-compound before floorcovering.
	Under floor Heating	◆ Failure on floor temperature control during installation. ◆ Failure on selecting proper adhesive.	➢ Floor temperature should be carefully managed before and during floorcovering installation. ➢ Adhesive for underfloor heating system should be used.

Defects	Cause & Phenomenon		Solutions
Wave	Swelling Pocket	◆ Continuous concentrated heavy load exceeding floor tile load limit causes partial deformation.	➢ Disperse the concentrated heavy load according to product load limit.
Joint connection failure	Shrinkage/Expansion	◆ Sudden wide temperature changes or concentrated heat/coldness exposure on the floor caused shrinkage or expansion (burning / crack)	➢ Proper temperature management prior / during / after installation. ➢
	Tile to tile Connection failure	◆ Adhesive spillage or adhesive contamination ◆Tile pattern connection mismatch ◆ Tile to tile joint connection failure from tile cutting	➢ Follow proper adhesive usage instruction and keep the open tile ➢ Be careful on pattern matching during tile installation. ➢ Use proper installation tools.
Curling	◆Tile edge or jointing part is detached from the subfloor from improper pressure rolling. ◆ Failure on adhesive bonding power. ◆ Moisture or sudden wide temperature changes.		➢ Apply Pressure Rolling ➢ Apply proper adhesive choice and keep the adhesive open time and applicable drying time limit. ➢ Control moisture and proper temperature.
Mold gathering	◆ Good circumstance of mold gathering from old floor covering, carpet or wood, wall paper, low grade adhesive, etc under warm and damp condition may gather mold.		➢ Remove old floor covering. Use good quality adhesive. ➢ Apply cleaning disinfector chemical.
Different Colors	◆ Mixed installation of different production batch tiles. ◆ Mixed installation of tile direction printed in back side.		➢ Install same production LOT tiles. ➢ Follow direction guidance
Discolor-ation	◆ Hcl or Aid chemical usage with metal cleaning tools causes discoloration of vinyl tile. ◆ Direct sunlight with strong UV layer causes discoloration of vinyl tile. ◆ Under floor heating lines or stove/heater areas may cause discoloration form high heat energy. ◆ Low grade floor finish wax or chemical may cause yellowish discoloration.		➢ Use neutral cleaner and good quality maintenance chemicals. ➢ Floor temperature should be under 40℃ ➢ Heating lines should be buried at least 2.5㎝ deep underneath from the surface. ➢ Apply good quality floor finish / maintenance chemicals.

Maintenance for HKFloors vinyl tiles

General Scope

HKFloors vinyl floor coverings, in common with all heavy duty floorings, require regular maintenance according to the certain maintenance standards. Satisfactory floor condition can only be obtained by keeping basic maintenance rules.

The factors to be considered in approaching the choice of a cleaning & maintenance method are the utilization and dimensions of the rooms along with the desired level of hygiene and optical appearance.

Therefore, the degree of cleanliness and hygiene of the floors will be determined by the cleaning method, which has been chosen together with its frequency and carefulness in application.

The following instructions are the main maintenance methods. Manual and mechanical cleaning procedures using various floor finishes can be switched in order to meet various hygiene and economical requirements.

HKFloors vinyl tiles have below general maintenance features.

- It can be restored the original surface quality of **HKFloor tiles** by **DRY** polishing with a low speed rotary machine (150~200RPM) and a red pad.
- To reach an extra shine, a white pad may be used for a final dry buffing.
- General maintenance like Spray Cleaning / Buffing / Damp Mopping using neutral pure water /Neutral detergent can be applied.
- Floor finishes like sealer or wax should be consulted and selected carefully according to the tile items and usage circumstances. Floor finish application on for Raian ESD protective floor covering special ESD control wax must be used.
-Abrasive / Burnishing / Polishing surface treatment using rotary machine may be applied for homogeneous structure items like HK Raian ESD vinyl tiles, Classe. However, never apply more abrasive pad than Red pad level on Hetrogeneous structure items like Raian OA tiles, DeArt tiles
- Avoid exposure of tile to excessive heat, direct sunlight.
- Strong solvent like acetone, turpentine, etc or toluene do attack PVC and may severely damage the surface of **HKFloor tiles**.

Commercial floor Maintenance

1. Initial Cleaning

Apply initial cleaning only after s enough adhesive drying time up to middle traffic setting condition (about 48 hours or more). Set Wet Floor Signs in all cleaning areas to be restricted and protected against slip fall accidents.

① Remove loose dirt and debris by sweeping or vacuum cleaning. Glue residues must be removed by an appropriate method. e.g. white spirit, Isopropyl alcohol.

Caution: Solvent like acetone, toluene, turpentine, etc do attack PVC and may severely damage the surface of tiles.

② Scrub the floor with a low speed rotary machine (150-200RPM) with a blue or green pad using neutral detergent.

③ If the floor presents heavy soiling or stubborn stains which cannot be removed with blue or green pads, more abrasive pads is suitable.

Caution: Brown or Black abrasive pad can be used for Homogeneous Raian ESD vinyl tiles and Classe tiles. However, never apply more abrasive pad than Red pad level on Hetrogeneous structure items like Raian OA tiles, DeArt tiles)

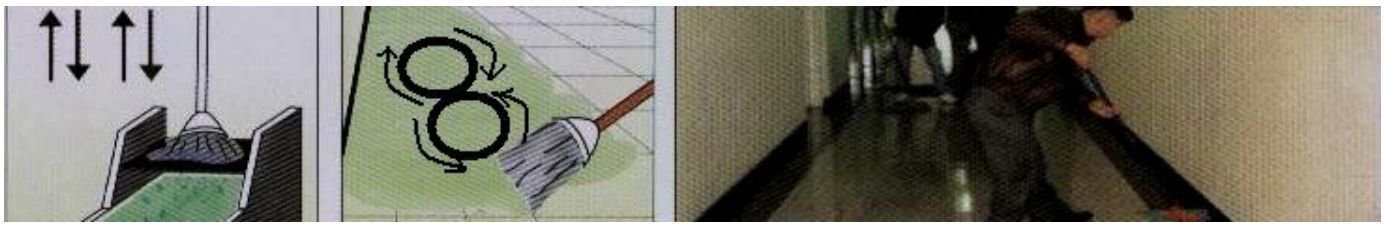
④ Thoroughly rinse and vacuum off the detergent residues from the floor.

2. Floor Finishes

Selective or imperative floor finish applications using proper floor maintenances chemicals like sealer, wax, or disinfect cleaner according to floor tile items' maintenance requirements and floor covered area circumstance. (e.g. hospital, extreme heavy traffic areas, etc) See the floor finishes requirements matrix.

- Floor finishes application requirements

Protective/Glossy finishes requiring items	Classe Deluxe, Classe Majesty marble, DeArt Optima wood, DeArt Woodian wood, DeArt Stoney, DeArt Impression
Non requiring floor finishes (Optionally applicable)	DeArt Prime timber, DeArt Imperial timber, DeArt Classic timber
Only ESD wax applicable items (Optional selection)	RAIAN ESD vinyl tiles (Prime LE, Elite Pro, Elite, Econo) RAIAN OA tiles, (Carpet, Marble, Axion)



① Consult and select suitable floor finishes according to floor tiles and usage circumstance. Read carefully the MSDS and detailed usage instruction. Some of HKFloor tile items do not require floor finishes.
② Apply enough dwelling time or dry time.
③ It is required 2 ~ 3 times coats of polish to newly covered floor to secure enough protective layer setting and slip resistance. Do not apply more than 4 times in one time.
④ ESD wax and cleaner must be applied for static control Raian floor coverings.

3. Daily maintenance

Remove dirt with a damp mop and neutral detergent or disinfectant. Dry sweeping may be sufficient.

4. Periodical Maintenance

If heavy contamination or overlaid coated wax need to be removed to restore the clear color and pattern of HKFloor tiles, apply stripping processes.

1) Stripping

① Consult and select suitable stripping chemical according to floor tiles and usage circumstance. Read carefully the MSDS and detailed usage instruction from its manufacturer.
② Set Wet Floor Signs.
② Remove dirt by sweeping or vacuum cleaning.
③ Apply striping chemical according to the manufacturer's usage.
④ Apply enough dwelling time.
⑤ Optional low speed ((150 ~ 200 RPM) rotary machine with suitable pads can be applied to secure the enough stripping result.
Caution: Brown or Black abrasive pad can be used for Homogeneous Raian ESD vinyl tiles and Classe tiles. However, never apply more abrasive pad than Red pad level on Hetrogeneous structure items like Raian OA tiles, DeArt tiles)
⑥ Thoroughly rinse and vacuum off the stripping chemical residues from the floor.
⑦ To adjust pH level of the floor, apply proper neutralizer.

2) **Floor Finishes**

① Apply floor finishes like sealer, wax or disinfect cleaner. Consult and select suitable floor finishes according to floor tiles and usage circumstance. Read carefully the MSDS and detailed usage instruction. Some of HKFloor tile items do not require floor finishes.
② Apply enough dwelling time or dry time.
③ It is required 2 ~ 3 times coats of polish to newly covered floor to secure enough protective layer setting and slip resistance. Do not apply more than 4 times in one time.
④ ESD wax and cleaner must be applied for static control Raian floor coverings.

5. Maintenance Procedure Diagram for HKFloors tiles

Sweep or dry mop daily with clean dust mop

Damp mop as needed

Normal scrub
for dirt, grime, scuff mark

Heavy scrub
For tough marks

Rotary buffing machine or scrubber-drier machine with reddish pad.

Rotary buffing machine or scrubber-drier machine with green/blue pad.

Scrubbing with a rotary machine with proper pad, Applying neutral pH detergent

Scrubbing with a scrubber-drier machine with proper pad, applying neutral pH detergent

Damp mopping to wipe up dirty solution and rinsing with neutral clear water

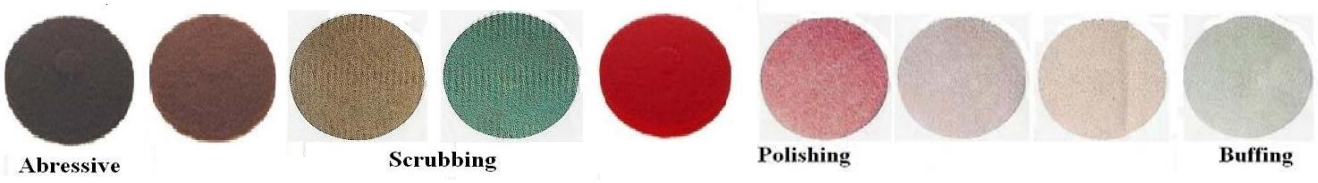
Allow dry completely

If tough marks remain, repeat process or change the pad to more abrasive one.

If tough marks remain, repeat process or change the pad to more abrasive one.

Once floor is dry, buff to shine with low- speed "swing" rotary buffing machine with dry red or white pad.

Pads for rotary machine



Homogeneous tiles only

Static control floor Maintenance

A. General ESD Vinyl Floor Maintenance

• Construction end cleaning

1. After tile installation, remove loose dirt and debris by sweeping or vacuum cleaning.
Glue residues must be removed with an appropriate cleaner. (e.g. white spirit, Isopropyl alcohol)
Caution: Strong solvent like acetone, turpentine, etc or toluene do attack PVC and may severely damage the surface of **HK Raian® tiles**.
2. Scrub the floor with a low speed rotary machine (150-200RPM) with a red pad using neutral detergent.
3. If the floor presents heavy soiling or stubborn stains which cannot be removed with blue or green pads, more abrasive pads like brown or black, if necessary in conjunction with a metallic mesh, can be used for **HK Raian® ESD vinyl tiles.** However never apply more abrasive pad than Red pad level on **HK Raian® OA tiles.**
4. Thoroughly vacuum off the residual dirty solution.

2. Daily cleaning

Small rooms or areas with light traffic
Daily damp mop the floor with impregnated single use towels.

Areas with Medium or high traffic
Spray buff with a rotary machine at low speed, using a scrubbing pad (among reddish pads) and a spray cleaning compatible, neutral and wax-free cleaning solution.
Note: This is most appropriate cleaning method for raised access floors.

3. Periodical cleaning

Small rooms or areas with light traffic
Wet mop the floor with well-squeezed mop, Using a natural clean water and detergent.

Areas with Medium or high traffic
The use of a scrubber-drier machine with a specific detergent is recommended.

As an alternative to mechanical cleaning with the scrubber-drier machine, Also scrubbing the floor with a rotary machine and removing the dirty solution With a wet-vacuum can be considered.

B. Cleanroom ESD vinyl floor Maintenance

1. Checking points on Cleaning in clean room environments

1. The cleaning process must comply with site safety regulations for potential hazards for operators and equipment, protection regulations of cleanroom.
2. The cleaning process must safeguard the surfaces to be cleaned. (No harsh chemicals, choice of appropriate detergents).
3. The cleaning process must strictly comply with site operating procedures, be carried out by specialized personnel operating with qualified means.
4. Choice and qualification of any products and equipments to be utilized. (Proper Choice of clean room compatible mops and wipers, provide HEPA or ULPA filtration on wet & dry vacuum cleaners entering the clean zone, ultraclean material, behavior of personnel)
5. The cleaning process of an area must always follow the airflow direction of that area.
6. The cleaning process must carry out from areas the most sensitive to contamination (most Critical areas) to those less sensitive to contamination (I.e. from fabrication areas to general areas and from the cleanest to the less clean classes).
7. The cleaning process must proceed from the “less dirty” to the “dirtiest” areas (if this is conflicting with rule no.6, than rule no.6 will prevail. For example, if the equipment is dirtier than the general areas when production finishes then start the cleaning with the equipment, that is to say, going from the critical to the general area.

2. Principles of Initial floor cleaning at first clean room start-up

(after completion of construction or Re-start of clean room operation after a technical stop)

After floor construction in cleanroom, initial floor cleaning to bring all surfaces within the clean zone into a cleanliness condition which is compatible with the protected operation to be carried out within that zone and the required clean room class.

An initial floor cleaning at first clean room start-up is divided into three different steps:

- **Traditional cleaning of visual quality**
- **Self-decontamination air treatment operating of clean room.**
- **Ultrafine cleaning to attain clean room condition**

In the case of a new building, these steps will be preceded by the concepts of clean job site and construction material protection (especially floorings) during construction.

Detailed information on each stage shall be provided on the request.



3. Daily cleaning or periodical maintenance under clean room operating conditions.

Cleaning operations must be carried out as long as possible before the start of critical fabrication processes in the protected area, in order to allow for the contamination generated by the cleaning process to be evacuated by the air treatment system. Specifically, cleaning in the evening after production finishes is preferable to in the morning before production starts.

Depending on the type and sensitivity of the clean room activity (cleaning at critical times or not), on the major contaminants to be eliminated, on the quantity of contaminants deposited on the surfaces to be cleaned and on the floor type (perforated or not), all or only part of the following 7 methods will be applied:

Technique	Most commonly used equipment	Products
Removal of fabrication waste (e.g. liquids, powders, silicon, conditioning items)	♦ Manual removal ♦Vacuum cleaner equipped with "absolute" filter.	
Dust removing	♦ Vacuum cleaner equipped with "absolute" filter or central vacuum system. ♦ Damp mopping	♦ N.A ♦ Single use wipers moistened with ultrapure water and isopropyl alcohol or specific clean room detergent.
Total or partial floor washing (except raised floors with or without perforations)	♦ Scrubber-driers ♦ Clean room mop with single use wet mopping cloth	♦ Specific clean room detergent or disinfectant
Removal of the dirty cleaning solution (except raised floors with or without perforations)	♦ Wet &dry vacuum cleaner equipped with "absolute" filter	
Rinsing (except raised floors with or without perforations)	♦ Scrubber-driers ♦ Clean room mop with single use wet mopping cloth	♦ Ultra-pure water
Removing of the dirty rinsing water (except raised floors with or without perforations)	♦ Wet & dry vacuum cleaner equipped with "absolute" filter	
Disinfection	♦ Wet-mopping equipment ♦ Powdering equipment ♦ Brominating equipment	♦ Contact disinfectant ♦ Contact disinfectant ♦ Air borne disinfectant

Remarks:

- Suction is more effective on particles above 30 microns (visible) or for large quantities of particulate waste.
- Damp mopping (not wet mopping) perfectly eliminates particles under 30 microns from smooth surface.
- In the case of perforated raised floors, the above two methods must be applied jointly as they become complementary to each other.
- A wet mopping can be carried out on raised floors with or without perforations, as it allows to eliminate loose dirt or easily soluble soiling. It is however vital to take care that cares no liquid drips into the plenum under the raised floor.

Specification standards for cleaning equipment and consumables for use in clean rooms.

Cleaning equipment and consumables to be used in clean rooms should meet, depending on the specific cases, the following conditions:

1. Effectiveness in use and performance as expected in the specific case with a specific method
2. Ergonomics (dimensions, weight, shape) and ease of storage
3. Ease of cleaning, washing, drying, disinfecting
4. Resistance to chemicals used in the clean room
5. Resistance to the cleaning products used
6. Abrasion resistant against the surfaces to be cleaned
7. Resistance to any special operating temperatures or sterilization
8. Supplier must be able to deliver precise product specifications and should be ISO 9000 certified (tracking, continuity of supply)
9. During their use, no release of chemical, microbiological, electrostatic or particulating contaminants, which are not compatible with, protected activity
10. Does not harm the surface to be cleaned
11. Compliance with safety and environmental protection regulations.

Rotary machine for Cleanroom usage

With HEPA / ULPA filtering system

Mop for Cleanroom usage

4. Main methods of periodical Cleaning maintenance of clean room floorings (According to the air classes and industrial types)

Industries or services	Air Classes according to US FD209	Major contaminants	Most current floor cleaning methods during clean room operation (All or some of the actions listed to be carried out as judged appropriate in the particular case)
Micro-electronics	Class 1 to 1000	♦ Particulate contaminations as from 0.06 microns ♦ Chemical and molecular contaminations by silicon as little as some PPB only ♦ Microbiological contamination of fluids at very low levels. ♦ Electrostatic contamination at very low thresholds.	♦ Vacuum cleaning ♦ Damp mopping (For perforated raised access floors, vacuum and mopping must be used jointly). ♦ Washing of sticky mats ♦ Spray cleaning and dry buffing with clean room compatible rotary machine before clean room re-start after technical stop.
Electronics Assembly	Classes 100,000 to 100	♦ Particulate, chemical or electrostatic contaminations depending on the sensitivity of the activity	Same as microelectronics, possibly with lower grade consumables
Health care industries	Classes 100 to 100,000 Classes A to D According to GMP	♦ Particulate contamination ♦ Cross-contamination between products ♦ Microbiological contamination with variable thresholds according to the galenical form.	♦ Elimination of dry or humid fabrication waste ♦Vacuum cleaning and/or damp mopping if dry floor ♦ Preliminary disinfecting ♦ Removing of dirty cleaning solution by squeegees ♦ Rinsing and removing of dirty rinsing water ♦ Contact disinfections ♦Periodical mechanical washing at technical stops
Hospitals	Micro-iological controlled rooms, from unclassified to class 100	♦ Microbiological direct and cross-contamination ♦Electrostatic contamination in operating theatres	Same as health care industries

Surface treatments	Classes 100.000 to 100	♦ Particulate contamination as some microns only ♦ Chemical and particulate contamination as little as some PPM only	♦ Elimination of fabrication waste ♦ Vacuum cleaning ♦ Manual or mechanical washing at high pressure
Food industry	Microbiological controlled rooms, from unclassified to class 100	♦ Microbiological contamination at very low levels, depending on product type ♦ Particulate macro-contamination	♦ Elimination of fabrication waste ♦ Preliminary or mechanical at high pressure ♦ Removal of dirty cleaning solution by squeegees ♦ Rinsing and removing of dirty rinsing water ♦ Contact disinfections

Note : *Above information is general guidance purpose only. Any cleaning & maintenance process must strictly comply with site operating procedures & regulations, be carried out by specialized personnel operating with qualified means.*

For further information, please contact:
HANKUK SPECIAL MATERIAL. CO., LTD TM
289-5, Heesung B/D,Yangjea-dong, Seocho-gu, Seoul, Korea
Tel: ++822-578-4527 Fax: ++822-578-4529
Attn: Kevin Jeong / Sales & Project Manager ,
HM MAENG / Sales Engineer
KH Lee / QC Manager
E-mail: Raian@hk-material.com
website: www.HK-material.com
www.HKFloors.com