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INSTALLATION PROCEDURES

ESD STATIC CONTROL SHEET AND TILE FLOORING

ESD EURO-FLEX® CONDUCTIVE SHEET
ESD EURO-FLEX® CONDUCTIVE TILE
ESD UNIFLOOR® STATIC DISSIPATIVE SHEET
ESD UNIFLOOR® CONDUCTIVE SHEET
ESD UNIFLOOR® TILES

CONDUCTIVE ADHESIVE TECHNOLOGY

SIGAWAY® ELECTRONIC DOUBLE SIDED SELF STICK DRY ADHESIVE FLASH COVING WITH SIGA CONTACT
WATER BASED CONDUCTIVE ACRYLIC ADHESIVE TECHNOLOGY

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1. General information

1.1 Storage and Transport

All ESD Unifloor(R) and ESD Euroflex™ rolls should be shipped and stored upright at all times. Storage outdoors, storage on uneven surfaces, storage of roll laying flat on palettes or racks, or storage on other than man-made surfaces is not permissible and will void any warranty claims.

1.2. Limited Warranty

Tek Stil Concepts, Inc. makes no warranty of merchantability or of suitability of its products for any particular purpose and sells its products upon the condition that customers shall conduct their own tests to determine the suitability of the products for their intended purpose. Under no circumstances shall Tek Stil Concepts, Inc. be liable for economic, special, incidental or consequential damages or losses of any kind whatever.

Limited Warranty

The Products are warranted for one year from the date of shipment against manufacturing and material defects, provided SELLER'S instructions and recommendations relating to the installation and maintenance procedures are complied with. SELLER warrants that the Products will conform to the description of the order confirmation, and that the Products delivered will be of fair, average and consistent quality within the description. If purchased by sample, the Products shall conform to such sample with only such reasonable' variations as are, in the opinion of' the SELLER commercially acceptable. The SELLER does not guarantee color marbleization and shade matching, however, SELLER warrants that Products from identical dye lots will be of commercially acceptable color match. The Products shall be warranted for a period of five (5) years against non-conformance with technical properties or specifications expressly agree upon by the parties in writing and against deterioration of such properties or specifications under ordinary and normal conditions of use The SELLER'S obligations under this warranty are limited to repairing or at its sole option replacing Products if notice of defect is given to the SELLER in writing and if the SELLER'S examination shows that the Products have failed under the terms of the above warranty, The SELLER shall not be responsible for installation costs involved in the repair of replacement of such Products, or in freight costs for replacement materials. This warranty shall be null and void if the Products have been stored improperly or outdoors, or on uneven or not man-made surfaces, or if they have been exposed to unusual conditions, such as fire, smoke, flooding, oil based grease or asphalt based chemicals or coloring substances. The SELLER shall not be responsible for problems caused by moisture hydrostatic pressure, excessive alkali in concrete flooring, or by weak or uneven floor substrates. Complaints for defects caused by faulty installation, abuse, vandalism, improper maintenance, gouges, cuts or indentations caused by improper floor protectors, or by movement of heavy machines, instruments of pieces of furniture over installations will not be accepted. ***All other warranties, express or implied, including any implied warranty to*** *the* effect ***that the goods shall be fit for a particular purpose and any liability of the SELLER for consequential damages are hereby excluded. No representative or agent of the SELLER shall have the authority to make any representation, agreement or promise. except as stated herein. The SELLERS liability for acts of his agents is limited to gross negligence.***

Tek Stil Concepts, Inc. refers to adhesives, underlayment products and tools or accessories manufactured by others only in the context of a recommendation of the type of product to be used, but cannot assume warranties for performance, quality or suitability of products of other manufacturers. It is the user's responsibility to adhere to all warnings and safety precautions contained on the labels or instructions sheets for all products.

All instructions provided herein are based on state of the art installation experience, or on generally accepted installation or workmanship procedures for ESD conductive PVC monolithic flooring. Tek Stil Concepts, Inc. cannot accept any liability whatever therefore. Site and job conditions may vary widely and cannot be predicted for all circumstances. The installer should precisely investigate the suitability of the recommendations provided herein by making small test installations prior to beginning large installations.

2. Sub floors And Preparation of Sub floors

2.1 General

All sub-floors must be free of paint, dirt, oil, grease, wax, moisture, alkali, salts, varnish or any foreign substances and must be broom clean. Do not use solvent based cleaning agents on concrete. Do not use solvent based felt pens to mark the back of flooring of the sub-floor, as these markings can be absorbed by the plasticizer and transfer to the surface of the flooring.

Concrete sub-floors must be constructed as per American Concrete Institute 302.2 “Guide for Concrete Slabs that Receive Moisture Sensitive Flooring” and prepared according to ASTM F 710 “Standard Practice for Peparing Concrete Floors to Receive Resilient Flooring”.

ESD Unifloor(R) Conductive homogeneous PVC (solid vinyl) flooring or ESD Euro-flex™ may be installed over new or over existing concrete, wood, poured asphalt, ceramic tile, terrazzo, marble, metal, or over existing epoxy, VAT, VCT, PVC, or linoleum flooring provided that existing flooring is free of voids, cracks and is firmly bonded in all areas to the flooring beneath. Fix unevenness or cracks with a gray Portland cement based acrylic patching compound or self-leveling compound. The use of gypsum based leveling or patching compounds is not permissible.

Sub-floors must be dry and constructed in such a way that moisture cannot seep through and damage adhesive or product. A film vapor barrier (moisture barrier) must be provided for all on-grade or below-grade installations, or whenever Unifloor(R) is to be installed above wet rooms, such as pools, canteen kitchens, and shower rooms. The vapor barrier may be dispensed with only if there is a positively and continuous longitudinal and lateral force-ventilated 12”-30" hollow space underneath the installation.

2.2. Sub floor Moisture

ESD Unifloor(R) and ESD Euro-flex™ are totally water proof and water impermeable. These products therefore are a barrier to evaporation of sub floor moisture. Moisture itself and/or alkali which are introduced to the concrete surface by hydro-kinetic pressure will damage Unifloor(R) adhesives and installations.

2.2.1. Correctable Moisture Conditions

- Excess moisture may be due to “green” (insufficiently cured concrete) which can be corrected by allowing additional curing time. Concrete curing times depend upon the mix, wet curing, of the concrete, thickness of slab, time of the year of pour (summer/winter) and the ambient temperature and humidity. Curing times may range to3-6 months or longer.
- Moisture may also be surface moisture, such as that introduced by a leaking roof. This can be dried with space heaters and forced air flow.

2.2.2. Dangerous Types of Building Moisture

Unless a vapor barrier is installed underneath the slab, excessive moisture may be due to a combination of

- Water vapor (Water vapor will travel from one area to another whenever a difference in water vapor pressure exists between the two areas.)
- Capillary Action (travel of water from a lower to a higher area.)
- Hydro-kinetic or hydro-dynamic pressure (water forced through the slab by the weight of the water in the soil surrounding the foundation.)
- Leakage (liquid water travels from a higher to a lower plane due to gravity, surrounding and flooding the area below the slab, where crushed stone may have been used to interrupt capillary action.) Landscaping, driveways, and parking lots are frequently pitched towards buildings.

2.2.3. Sub-floors must be tested for moisture prior to installation.

- Test per ASTM F 1869 "Standard Test Method for Moisture Vapor Emission Rate of Concrete Sub-floors Using Anhydrous Calcium Chloride"
  One test should be conducted for each 1,000 sft. **Moisture limits are <3.0/lb./1000 sft. in 24 hours.**
- Test per ASTM F 2170 "standard Test Method for Determing Relative Humidity in Concrete Floors using *in-situ* probes. **Moisture Limit is <80% Relative Humidity**.
- The **pH of the sub-floor should be between 7-9.**

Caution:

- The installer should inform the owner that moisture tests only indicate the moisture condition at the time of testing. Future intrusion of moisture could occur if water tables change, if there is no film vapor barrier installed. If the presence of a vapor barrier is unknown, it is advisable to conduct a core drilling test and search for the presence of a film barrier above the granulate or attached to the concrete core.

If these values area exceeded the installation must be halted until corrective measures are taken.

Corrective measures may include additional curing time for the slab, or bead blasting and installation of epoxy water barrier primers. Tek Stil Concepts, Inc. or the manufacturers of ESD Unifloor or ESD Euro-flex do not provide warranties for such primers, which however may be warranted by their manufacturers.

Note:
The installation and performance of a moisture barrier is the responsibility of the building owner or general contractor, not the flooring installer. The installer should decline the responsibility for any installation where moisture barriers are not provided on- or below-grade. The installer should inform the owner that **moisture tests only indicate the moisture condition at the time of testing**. Future intrusion of moisture could occur if water tables change. ESD Unifloor(R) or ESD EURO-FLEX™ **may not be installed** on-grade or below-grade, when hydro-kinetic pressure conditions exist, and/or a guaranteed vapor barrier is not provided.

Moisture Condition Disclaimer
Floor Covering Installations cannot be guaranteed against damage caused by excessive moisture, alkaline substances, of fluid pressure from the sub floor material over which the flooring installation is made. Testing for moisture prior to installation only measures the condition of the sub floor at the time of installation, and in the areas tested and will not support any warranty against problems caused by excessive moisture in the future.

Caution:
ESD Unifloor(R) and ESD-Euro-flex™ should not be installed on-grade or below-grade whenever hydrokinetic (hydro-static) pressure or changing water table conditions exist, and when a guaranteed film moisture barrier has not been installed prior to pouring the concrete.

2.2.4 Documentation of Tests
All tests should be documented. A moisture test form should be filled out and witnessed by an authority on the site such as a job superintendent, owner or contractor. A copy of the test results should be sent to the general contractor or owner. The test results should indicate each test by number, location in the building, date and time of the test.
For the CM test, record moisture in Percent. For the RMA (calcium chloride test) the starting and ending weight, the weight gain, total hours, and pounds of emissions must be recorded.
Note: It is recommended that a representative of the general contractor or building owner witness the test and sign the test data sheet.

Appendix 2.2.5. shows a representative Moisture Test Documentation Form

2.4 Sub floor Preparation

2.4.1. Concrete sub floor Mechanical Preparation

Concrete sub floors should be dry, smooth, level, dense and absorbent. They must be free from expansion joints, depressions, sealants or foreign substances of any kind. Pre-stressed concrete planks should be finished with at least 2-3 inches of high density concrete topping and reinforced with wire mesh to prevent cracking. Rough spots in the concrete should be leveled with clean, moist, sharp white sand, using a terrazzo grinding machine. Cracks should be cleaned and filled in with gray Portland cement/acrylic or epoxy based filters.

Note:
Expansion joints should not be covered with flooring.

2.4.2 Underlayments

Porous or highly absorbent concrete should be given a prime coating of diluted liquid adhesive prior to troweling on a latex based gray Portland cement mastic. The cement mastic should be of adequate strength to absorb impact and rolling loads so as to avoid breakdown under traffic. An average depth of 0.08" is recommended for troweled latex based gray Portland cement mastic underlayment. Mastic must be dry and cured prior to installation. Self leveling gray Portland cement with acrylic milk underlayment is recommended. Single component “add water only” gray Portland cement leveling agents should be avoided due to inherent weakness: if they are used, add an acrylic binder instead of water.

Note:
Gypsum (white patch) **may not be used** under ESD Unifloor(R) or ESD Euro-flex because of inadequate strength.

2.4.3 Wood sub floors

All wood sub floors should have at least 18" air space between the ground and the wood floor with adequate cross ventilation beneath them to keep them from damp and rotting. Unifloor(R) should not be installed on wood sub floors that are directly in contact with on- or below-grade concrete sub floors, even if separated by sleepers. Wood sub floors must be cleaned of varnish, oil, paint and waxes. Single layer plywood combination sub floor underlayment is suitable for Unifloor(R) when-installed according to American Plywood Association recommendations. All panel compositions and configurations rated as standard APA Sturd-I-Flor, regardless of type, must be installed according to APA and the manufacturer’s recommendations. Wafer board, oriented stand board and structural particleboard require an additional 1/4" underlayment.

Wood sub floors shall be 1/2" or heavier plywood (APA grade or double layer tongue- in-groove strip wood not over 3" face width covered with 1/4" or heavier plywood, APA underlayment grade.) Single layer wood floors, not tongue-and-groove or tongue-and-groove strip wood over 3" face width should be covered with 1/12" or heavier APA underlayment grade plywood installed according to APA specifications. Cracks wider than 1/8" and holes larger than 1/4" in diameter should be filled with snugly fitting wood or epoxy based filler. Defective boards must be replaced with sound material. Loose boards must be re-nailed. All unevenness should be leveled. Latex based gray Portland cement leveling compounds should not be used on wood. Use special leveling compounds instead.

2.4.4. Poured Tar-Free Asphalt Underlayment

Poured asphalt underlayment ise sometimes applied as a humidity barrier. They should be free of bubbles, cracks or voids. The Surface must be sanded or level. If the surface is not pre-sanded, a film forming primer must be brushed on. A gray Portland cement based latex filler must be troweled on in .08”thickness and dried prior to installing the flooring.

2.4.5. Terrazzo, Epoxy, ceramic tile, marble or metal sub floors
These are considered non-absorbing sub floors and must be primed accordingly. The sub floor must be firm and without loose areas, free of oil and foreign substances, and insulated adequately against intrusion of humidity. A film forming primer, such as latex or solvent based cement should be applied, to be followed with an application of self leveling compound or troweled latex based gray Portland cement mastic. Leveling of old quarry or cement tile can be accomplished with Ardex K-15 or similar. If installations will be made with water based adhesive UZIN KE 2000 SL conductive adhesive, any non-absorbent sub floors must receive an .080" thick absorbent gray Portland cement based or Ardex K-15 coating prior to applying the liquid adhesive. See separate instructions for Sigaway dry installation method.

2.4.6. Old PVC, VAT, VCT, Epoxy, Urethane or linoleum floors
Installations may be made only when existing flooring is totally bonded to the sub floor in all areas, with the old adhesive showing adequate strength and integrity. Further, the floor must be adequately insulated against intruding moisture. Any residual waxes, floor polishes, paints, or residues of floor care products must be removed by sanding or solvent wash. **If in doubt, remove existing flooring, adhesive, prime, level and prepare sub floor as per 2.4.2.**

Caution:
Do not sand asbestos containing products - health hazard.

2.4.7. Installing Over Cutback Adhesive
Cutback can stain and permanently discolor ESD Unifloor(R) or ESD euro-flex™ with time. Cutback should be isolated from the Unifloor(R) adhesives and flooring by applying sufficient thickness of gray Portland cement acrylic milk re-enforced underlayment in > .08" thickness and dried prior to installing the flooring.

2.4.8. Miscellaneous Sub floors
Please consult the factory representative whenever you encounter unusual sub floors or installation requirements.

2.4.9. Joints between different height sub floors or between different gauge flooring
These can be eliminated by feathering a high quality latex based gray Portland cement compound, such as Feather Finish prior to installing the thinner flooring. Alternately metal or PVC T-profiles may be used to cover such joints.

3.0 Installation of ESD Unifloor(R) (Solid Homogeneous Vinyl) and ESD Euro-flex™ (extruded PVC) Sheet and Tile

3.1. Factory Labels

Each roll or carton of tile features important information on labels, such as Product Name, roll size, color name or number, Dyelot number or shade number. Also there are roll or tile serial numbers.

3.1.1. Record The (Serial) Numbers and Dyelot Numbers Used in each Area

The installer should make a permanent record of the Serial number of the Roll Number and Dyelot Number of each roll or carton of tile which is to be installed in a particular area. This number is an important quality control identifier which must accompany any claim or questions as to product variances.

3.1.2 Confirm Product Type, Dyelot, Color, And Absence of Transport Damage or Visual Defects.

It is the installer's responsibility to check that all materials to be installed are of the correct product type and color. labels identify dye-lots. It is the installers responsibility not to-mix dye- lots in the same area. Color match of adjacent sheets should be visually confirmed under good lighting conditions prior to installation. Slight color differences between rolls can be minimized by rearranging rolls. **The factory cannot be held responsible for color differences or other visible defects once materials are glued down.**

3.2 Condition and Relax Flooring Before Fitting

3.2.1. Conditioning

It is necessary to **condition the building, adhesives, and PVC flooring at a temperature not below 68-70°F (18-21°C).** Remove the factory wrappers from rolls during conditioning. Allow 2-3 days to condition PVC materials at these temperatures if they were brought in from colder storage. Tiles should be placed only one carton high during conditioning.

3.2. Relaxing Sheet Flooring

PVC flooring has a memory. To remove the tendency of unconditioned rolls to curl (returning to rolled memory), the conditioned sheets should be unrolled and allowed to relax for at least 2-5 hours prior to fitting at a temperature not less than 68-70°F (18-21°C). Several rough cuts of ESD Unifloor(R) or ESD Euro-flex™ (5-6 layers) may be stacked one on top of the other during relaxation. Relaxation is faster if the ambient temperature is >100°F. Rolls may be relaxed in 30 minutes to one hour if placed over an outside driveway on a hot summer day, for example. Egg-shaped (transport damaged or incorrectly stored) materials may have to be relaxed with a hand hot air blower, or using a space heater. However, transport damaged or incorrectly stored egg-shaped roll flooring materials may **never recover** from memory to ever lay perfectly flat Such damaged materials should not be installed. Inadequate relaxation may result in material lifting off wet adhesive in areas.

3.2.2. Relaxing Tile Flooring

Stacked cartons do not allow temperature conditioning. Tiles should be removed from boxes and and stacked in 15 tile lots. Take care not to curl tile edges during stacking. Condition for at least 24 hours >60°F.

Note:

The installer must inspect each relaxed sheet for edge straightness and any surface irregularities or damages. Do not install material which is damaged or defective.

3.3 Pattern Direction

ESD Unifloor(R) and ESD Euro-flex™ have a lengthwise (machine direction) oriented marbleized pattern direction. Generally, the machine direction (roll direction) should be at a right angle to the main windows, so as to minimize the visibility of welded seams. Tiles should be checker boarded.

3.4 Adhesives and installation

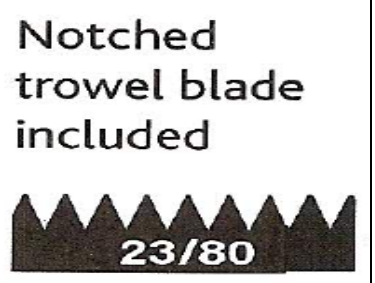
3.4.1 Approved Adhesives for ESD Unifloor(R Static Dissipative or Conductive and ESD Euro-flex™ Conductive

Unless specifically used as loose lay mats or runners, ESD Unifloor(R) and ESD Euro-flex™ sheets or tiles must always be glued down. Factory approved specialty adhesives are **UZIN KE 2000 SL water based Conductive Adhesive** or **Sigaway(R) Original or Sigaway(R) Electronic Dry Textile Reinforced Self Stick Sheet Adhesive**.

Ucin KE 2000 SL water based Conductive Adhesive is a non-flammable VOC-free one part adhesive. It may be installed on-, above- or below-grades, provided Factory specified moisture levels are not exceeded and **appropriate moisture barriers are provided for on- or below-grade applications.** This adhesive has excellent seam strength and does not require additional seaming adhesive when properly applied.

UZIN KE 2000 SL Conductive Acrylic Adhesive or **Sigaway(R) Electronic Dry Self Stick Conductive Textile Reinforced Self Stick Adhesive** are approved for ESD Unifloor(R) Static Dissipative or ESD Unifloor(R) Conductive and ESD euro-flex™ sheet and tile sheet and tile flooring. (see Section s 6.1 and 6.2. for detailed installation instructions for ESD Static Control flooring).

Fig. 3.4.1. Correct Trowel Type



Liquid Adhesive application must be between 150-160 sft./gallon (250-300 gm/m^2), depending upon the absorbency and condition of the sub floor.

Liquid Adhesive should be applied with a Type A-1 or 23/80 V-notched trowel. **A trowel blade ships with each pail of UZIN KE 2000 SL adhesive.** The Installer must confirm the actual application of 150-160 sft./gallon of liquid adhesive by measuring the spread rate. The correctly troweled adhesive should be almost smooth in appearance; there should be no voids between teeth of the trowel adjacent to high troweled lines (as results from inappropriate trowel types.)

Caution:
The installer should frequently replace or re-sharpen the trowel, as V-notched Trowels tend to wear faster at their points. Worn trowels result in insufficient adhesive application.

Caution:
Inappropriate (U notched) or coarse troweled adhesive pattern lines will telescope trough the PVC flooring and appear unsightly in a few days after installation.

Caution:
The user should always determine suitability of the products for their intended use by testing a small sample of the adhesive on a representative portion of the sub floor, along with the Unifloor(R) product to be installed, prior to installing a large area so as to assure that the system performs satisfactorily. A pull strength test after 2-3 days and prior to making the large installation is recommended.

Caution:
Store water based Acrylic adhesive above 55° F (13°C) at all times. Adhesive which was allowed to freeze is rendered unusable. Adhesive which was stored or shipped below a temperature of 50°F (10°C) may be damaged and may not be useable. Observe shelf life limitations, which are 2 years for and for UZIN KE 2000 SL Conductive Acrylic Adhesives.

3.4.2 Choice of ESD Static Control Installation Methods and Grounding

ESD Static Dissipative and Conductive floor systems are tailored for very specific electrical conductivity ranges and for specialized applications in electronics manufacturing, explosives, military, computer use and repair, medical, atomic research, and similar environments. The user of the specialized equipment or process must be consulted as to the precise ESD conductivity requirements for the flooring.

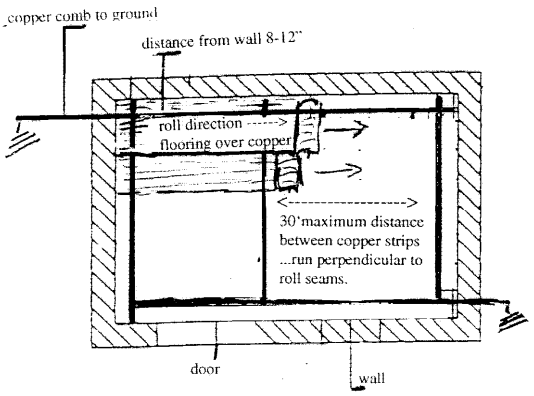
ESD Static Dissipative or Conductive Unifloor(R) installations may be made on any suitable dry and clean sub floor, and within the approved moisture limits as specified in Section 2. Installation requirements depend on the selected ESD flooring type, and on the conductivity or the electrical insulation (non conductivity) of the sub floor.

	Unifloor(R) Static Dissipative U Series rolls with conductive black backing	**Unifloor(R) Static Dissipative U78 Series with conductive black backing**	**Unifloor(R) Conductive UC Series with conductive black backing) ESD Euro-flex™ conductive**
Conductivity RTG	approx. 10^7 - 10^8 Ohms	$<10^7$ Ohms	$<10^6$ Ohms
When installing over electrically insulated sub floor:	Grounded copper ring circuit, UZIN KE 2000 SL conductive adhesive, or Sigaway(R) Electronic, or Sigaway(R) Original with Siga Circuit.	Grounded copper ring circuit, UZIN KE 2000 SL conductive adhesive, or Sigaway(R) Electronic, or Sigaway(R) Original with Siga Circuit.	Grounded copper ring circuit, UZIN KE 2000 SL conductive adhesive, or Sigaway(R) Electronic, or Sigaway(R) Original with Siga Circuit.

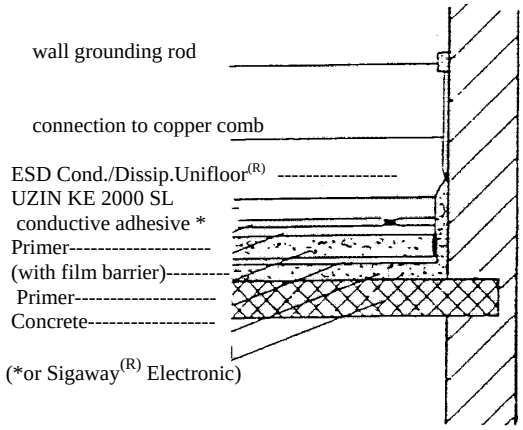
All conditioning, relaxing, fitting and installation workmanship and procedures outlined in point 3.1-3.4 for should be followed, except that either UZIN KE 2000 SL conductive water based acrylic adhesive or Sigaway® Electronic full surface textile reinforced self stick adhesive, (or Sigaway(R) Original self stick textile reinforced adhesive with Siga Circuit) must be used for ESD Unifloor(R) Static Dissipative, ESD Unifloor(R) Conductive or ESD Euro-flex™ installations.

See sketches for plan and sectional views.

6.a. Plan View of Grounded System over non-conductive sub floor



6.b. Sectional View of Grounded System over non-conductive sub floor



3.4.2.1 Installation Procedure with water based VOC-free acrylic adhesive

Fig. 3.4.2.1 Lay Out Oversize Sheets And Broom Clean

Broom clean and remove all dust and debris before laying out vinyl sheets.

Cut sheets approximately 1% over length. Both factory edges should be cut vertically.
Fold back a sheet of flooring halfway. Mark along edge of adjacent sheet with a carpenter's pencil. Then fold roll back this second sheet halfway.

Spread adhesive with a fine V-notched trowel, such as 1/16 x 1/6“ Depending upon the absorbency of sub floors, and ambient temperature and moisture conditions, about a 200 sft. area may be troweled at one time. Allow UZIN KE 2000 SL Conductive adhesive to skin over for approx. 15-20 minutes, before placing flooring materials onto the adhesive. Sheets or tiles must be placed onto the skinned adhesive. This waiting period allows for excess moisture to evaporate, reducing the inherent tendency of the vinyl flooring to reject water. After the adhesive is skinned over the vinyl will attract the skinned adhesive. The adhesive at this moment should readily transfer to the vinyl and **an equal amount of adhesive should be on the flooring and on the back of the vinyl when a 2-3 ft. section is rolled back**. If the adhesive does not transfer to the back of the vinyl, it is too dry and the vinyl should not be installed without a second spread of adhesive.

Fig. 3.4.2.2 Folding Back Vinyl and Troweling Approx. 200 sft. (shown with a black Conductive Adhesive not UZIN KE 2000 SL conductive adhesive)

Entrapped air causes bubbles. Starting from the center of the sheet, **feather out all entrapped air towards the edges, preferably by using a cork smoother manually** (see Fig. 3.4.3. on the next page.) This has the advantage that any entrapped air or laying defects can be inspected at eye level prior to the setting of the adhesive.

Less preferably, air may be feathered out **from the center to the edges** using a 125 lb. roller. This is not preferred because any entrapped air cushion can be spread over a large area, resulting in multiple air bubbles which become be visible once the adhesive has set and which can require time consuming repairs.

Joint areas are to be squeegeed thoroughly with the dressing hammer.

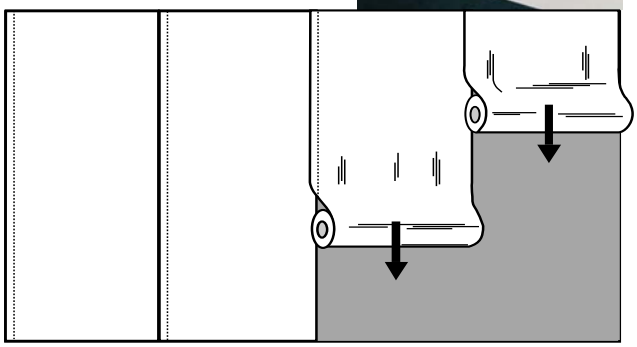
Finish by rolling the entire installed surface with a 125 lb. roller. Roll again after 6-12 hours. Wait 24-48 hours before routing (grooving) and heat welding materials that were installed with liquid adhesive, so as not to "cook" the adhesive and cause adhesive to leach into seams.

Fig. 3.4.2.3 Feathering All Areas Manually With A Cork Smoother: This prevents entrapped air from forming bubbles and hollow spots.

3.4.2.2. Installation with Sigaway® Original dry adhesive

3.4.2.1.a Unroll Sigaway® and apply pressure with a broom

3.4.2.1.b or use a cork smoother to apply pressure



Sigaway® Original may be installed over non-absorbent sub-floors, such as existing tile, epoxy, metal, or over normal concrete.

Follow the detailed installation instructions and observe product limitations included with each roll of Sigaway® Original.

3.4.2.1.a Roll out Sigaway and assure good contact with the sub-floor by applying pressure with a broom or **3.4.2.1.b** cork smoother and overlap by approx. 1inch.

3.4.2.2. Lay out an approx. 500 sft. area at a time on the same day that the sheet or tile vinyl will be installed.. Double cut the overlap.

3.4.2.3. Install the new vinyl flooring perpendicular to the Sigaway®.

3.4.2.4. overlap and double cut Sigaway®

3.4.2.5. Remove the Release paper

3.4.2.5. Fit seam areas, double cut and heat weld all vinyl sheet goods to prevent shrinkage

3.4.2.7. Use Siga Contact film to flash cove and heat-weld inside and as described in 3.7.

Note:
There is no waiting period to heat-weld installations made with Sigaway® and such installations may be immediately exposed to foot and rolling load traffic.

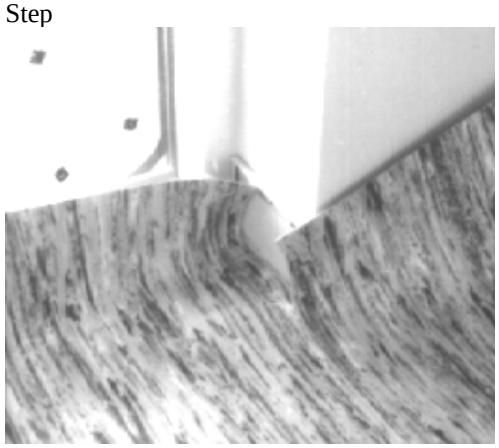
3.4.5 Installing Tiles

Section off the area in order to avoid unnecessary trimming of tiles. Use chalk mark guidelines.
In large areas start from the center of the room and install towards the wall.
Observe Adhesive spread rates and skin-over times.
Work backwards in order to avoid dislodging freshly installed tiles.

Note:
It is prefereable to **install ESD-euro-flex™ 2' x 2' (608mm) tiles at a half drop** instead of corner to corner, this minimizes alignment problems that are sometimes experienced due to sub-floor unevenness when installing large tiles corner to corner in large areas.

When installing solid vinyl tiles over Sigaway(R) Electronic make chalk lines on the old surface and marks will be visible through the Sigaway(R) Electronic.
Alternately place marks directly on the release paper. Remove enough release paper to start the first row of tiles and subsequently only uncover enough area as will be installed immediately. To provide access to raised access floors or trench covers over which ESD Unifloor(R) tiles have been installed, run a knife along the edges of the tiles right and left of the access area and peel a number of tiles or a whole row of tiles. The Sigaway(R) Electronic will stay on the back of the ESD Unifloor(R) tiles and can be re-installed once access is completed. Tile installations should be welded if pressure liquid cleaning is anticipated for the facility.

Fig. 3.5.1. Flash Coving Unifloor(R) First Step



3.5.1. Flash Coving (Self-Coving) Of ESD Euro-flex or ESD Unifloor(R)

If the installation is to be flash-coved , first clean, patch, level and remove dust and any old cove base adhesive residues. Apply **UZIN KE 2000 SL Conductive Acrylic Adhesive** or contact cement to both, the wall and the back of the vinyl portion which is to be coved. When using liquid adhesive allow the Adhesive on the wall surfaces to dry completely (30-45 minutes) before applying the vinyl with skinned (moist) adhesive.

When Flash Coving with **Siga Contact film adhesive,** the Sigaway® Contact film is applied to the wall only. Release paper should be left in place until the flash coving can be properly positioned. Inside and Outside flash coved corners may be heat welded immediately when installing with Siga Contact.

3.5. Production of Flash Coved Inside-Outside Corners

Newer technology has replaced the conventional "butterfly" technique (whereby a triangular piece of vinyl is heat welded onto corners.)

3.5.1. Example Inside Flash Coved Corner:

This workmanship entails straight fitting of the material at a 90^{o} angle into the corners and either heat welding or hot air puttying the seam closed, using a hot air gun and screw driver or similar tool. (See Photos in Section 8. "Repairs") Heated Unifloor(R) will act like a plastic putty. Using a large screwdriver or similar, putty the inside corner of Unifloor(R) until all voids are filled. After the seam is cooled, scrape off patched area with rounded knife.

3.5.2. Example Outside Flash Coved Corner

Fig. 3.6.1. Hot air Puttied Inside/Outside Corner

One side of the Unifloor(R) (left) is cut flush with the wall edge. The other side (right) is rough trimmed to fit over the corner plus the thickness of the vinyl (left piece). Hot Air puttying technology is used to weld these two pieces together without additional welding rod. After a cooling period of 10 minutes, the excess materials can be shaved off the corner with a Stanley knife and wood scraper.

Fig. 3.6.2. Hot air Puttied Inside/Outside Corners over Patch Leveled Wall.

3.6. Three Dimensional Installations

A three dimensional Unifloor(R) Installation is made in accordance with the technology outlined under 3.6. In case of this example, flooring is installed halfway up to pedestal base, a second sheet is installed halfway down. Edges are hot air puttied and clean shaven with Stanley knife and wood scraper. Where the upper and lower pieces meet (halfway up the pedestal, the seams are routed and heat welded.

Fig. 3.6.1 Example of Three-Dimensional Coving. With Hot air Putty Technologies, as Described Under Flash Coved Corners.

Fig. 3.7 Installing Contrasting Colors of Unifloor(R)
Attractive graphic designs can be created by inserting material pieces of a different color, and perhaps heat welding with a third, contrasting color. Generally, contrasting materials are double cut, seams are routed and heat welded.

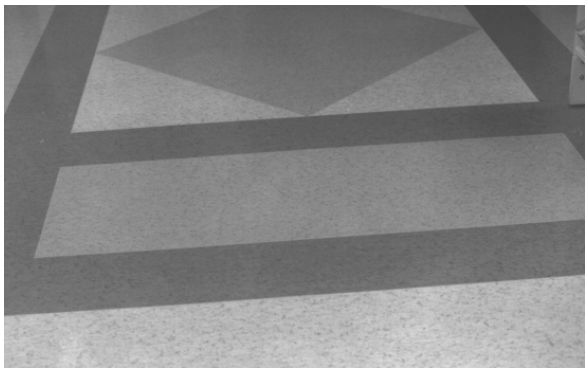


Fig 3.7.1. Heat welded Contrasting Color With Matching Weld Rod

3.8. Installation of ESD Unifloor(R) or ESD-euro-flex™ on Walls

Unifloor(R) Installations may be made from ceiling to floor, and can be heat welded using either a Floor-To-Ceiling Profile (see Fig. 5.2.), or can be heat welded to the flooring at the joints.

Fig. 3.8.1. Unifloor(R) **Flash-coved 12" up Wall and Heat welded With Contrasting Weld Rod On Walls**

Wall Installation requires at least two installation mechanics.
To install, support the roll by a scaffold near the ceiling height.
Pre-measure the lengths of material and re-roll same.
Apply solvent based contact cement to the top 3 ft. from the ceiling, and to the top three feet of the vinyl backing.
After the contact cement has dried on both surfaces, spread UZIN KE 2000 SL conductive acrylic adhesive on the wall, starting from where the contact cement ends to the wall base.
Carefully position the top three feet of the material, press against the wall, and slowly roll down the entire roll length.
Feather out all air from the center to the edges, and hand rub the material with the cork smoother. After adhesives are dry, re-rub, then heat weld, which hides unevenness of seams better than chemical weld.

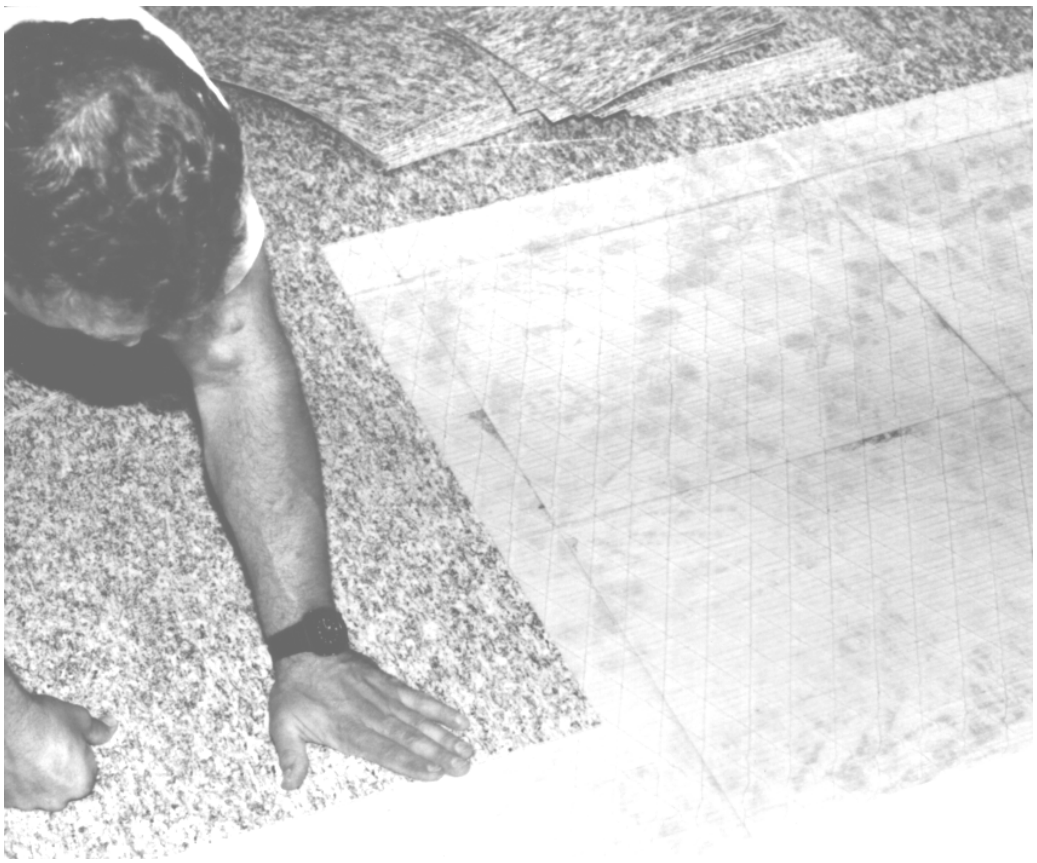
5. Details of Installation And Grounding with Sigaway(R) Electronic full surface dry conductive textile re-enforced self -stick V OC-free and solvent free Adhesive.

Please download product data sheet and MSDS from Technical Data at www.tekstilconcepts.com)

Sigaway(R) Electronic is an ESD Conductive full surface textile reinforced dry double faced self-stick adhesive. It is designed to be releasable from the sub-floor but has greater adhesion to the ESD Unifloor(R) or ESD euro-flex backing. Sigaway(R) Electronic features a woven network of graphite conductors which provide $<10^4$ Ohms conductivity.

Sigaway(R) Electronic can be installed over concrete, failed epoxy, wood or metal access floor panels. A key advantage is the use of Sigaway(R Electronic to install ESD flooring over non-absorptive surfaces (such as existing structurally sound existing vinyl floors, VAT tile, epoxy, painted floors, terrazzo, steel, aluminum plates, plastics and High Pressure Laminates (HPL)) saving the cost of applying trowel compounds that are required for liquid adhesives over non-absorptive surfaces, and saving costs of removal of old flooring or asbestos abatement. Satisfactory installation of ESD Conductive Unifloor(R) rolls can also be made and heat-welded over loop or cut pile 1/4" pile height glue down carpet (contact your distributor for details).

Photo 5.2.1 Sigaway(R) Electronic used to install ESD Conductive Unifloor(R) tile with conductive backing on steel access floor panels



Sigaway(R) Electronic is available in 39.4" rolls which are installed by overlapping and double cutting the seams, onto dry, dust-, and oil-free surfaces. Copper tape is used to connect Sigaway(R) Electronic adhesive sheets to multiple grounding rods.

ESD sheet (rolls) are installed perpendicular to the Sigaway(R) Electronic sheets. This facilitates the removal of release paper during installation. The installation is rolled with a 125 lb. roller. **The product provides instant adhesion, is odor and solvent free, and requires no waiting time for either heat welding, or startup of normal and rolling traffic directly after installation.**

ESD Unifloor**(R)** Conductive UC 288 or ESD Unifloor**(R)** Static Dissipative U or U-78 Series and ESD Euro-flex™ conductive sheet may alternately be installed with **Sigaway(R) Original,** which is supplemented by a network of **Siga Circuit 1.6"** tapes on the room perimeter, along the ESD Unifloor**(R)** or Euro-flex™ seams, and in 30' intervals connected to the perimeter perpendicular to the Unifloor**(R)** seams. The Siga Circuit Tapes are placed above the Sigaway® Original so as to directly contact the conductive black backing of the ESD Unifloor**(R)** Conductive or Dissipative flooring.

Photo 5.2.2 Example of grounding Sigaway(R) Electronic

<u>Note 5.2.a.:</u> The project owner should test the suitability of the grounding of the sub floor system prior to installation of the flooring and after completion of the installation, using instrumentation as specified in NFPA 99 or EOS/ESD 7.1. or as specified by the project owner. The installer should obtain copies of the test documents for permanent record.

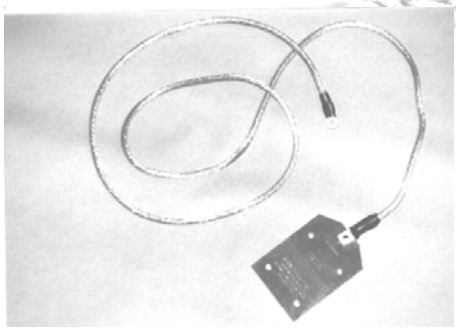


Photo 2.2.3 Grounding Plate
A grounding plate may be attached to ESD Unifloor**(R)** Conductive when used as loose lay or taped down floor matting.

5.2.3. Bill of Materials

Installation with Sigaway(R) Electronic dry self stick textile reinforced conductive adhesive, rolls or tiles:

- Unifloor(R) ESD Unifloor conductive, ESD euro-flex conductive, ESD Unifloor(R) static dissipative U78 or U Series; rolls or ESD Euro-flex™ Tile.
- Matching welding rod (coils @ 165 lft or 330' for Unifloor™ , or 850 lft (check stock). For Euro-flex™)
- Sigaway(R) Electronic, rolls 39.4" x 82'6"
- Siga 4600 self adhesive copper tape (rolls 0.5" x 66 lft., 2 rolls/pack)

5.2.4. Alternate Bill of Materials

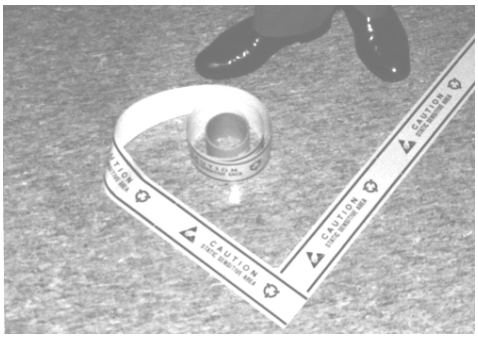
Installation with Sigaway(R) Original and Siga Circuit dry self stick textile reinforced conductive adhesive (suitable for ESD Euro-Flex™, ESD Unifloor(R) UC 288 Conductive, or ESD Unifloor(R) U or U78 Series Static Dissipative rolls, but is not suitable for tiles for any other ESD flooring lacking total application of a conductive black backing)

- UNIFLOOR® ESD Conductive or ESD Static Dissipative Series Rolls or ESD Euro-flex™ Rolls
- Matching welding rod (coils @ 165 lft. Or 330' or 825 lft. (check stock)
- Sigaway(R) Electronic, rolls 39.4" x 82'6"
- SIGA CIRCUIT, rolls @ 1.5" x 82'6"
- Siga 4600 self adhesive copper tape (rolls 0.5" x 66 lft., 2 rolls/pack)
- Self Adhesive Perimeter tape "Caution Static Sensitive Area" order # TSC-ESD-200

Caution:
Furniture and equipment placed over Static Dissipative or Conductive floors should be separately grounded. All carts used on ESD static control flooring should be grounded with drag chains, or similar devices.

Caution:
ESD Conductive or ESD Static Dissipative Unifloor(R) or ESD Euro-Flex ™ installations should be identified as ESD Static Control areas, and cleaned and maintained only with neutral non-film forming detergents. **The use of conductive waxes is not recommended by the Manufacturer,** because such waxes and dressings can build up, become soiled, and may act as insulators which affect the conductivity of the flooring. (see Maintenance Section 9).

Photo 5.3 ESD Perimeter tape
Designates static control areas



Caution:
When using ESD Conductive Unifloor(R) or ESD Conductive Euro-flex™ with an installed rating of $<10^6$ Ohms RTG (Resistance To Ground) special measures, such as providing 1 megohm resistors in footwear, may have to be taken to avoid electrocution hazards to personnel working on such conductive flooring. The management of the ESD facility (not the provider of the flooring materials) is responsible for establishing appropriate protective measures for the users of ESD conductive flooring.

6. Welding of Unifloor(R) Homogeneous Vinyl Flooring

6.1 To Weld Or Not To Weld

Installations of **ESD euro-flex rolls, ESD Unifloor(R) Static Dissipative or ESD Unifloor(R) conductive MUST be heat-welded** for dimensional stability, resistance to rolling loads, contamination from above and to avoid chemicals or cleaning fluids penetrating through the seams and attacking adhesive underneath:

Welding is required for any installation of:

- ESD Euro-flex™ or ESD Unifloor™ Conductive rolls
- Unifloor Static Dissipative or Conductive rolls
- Whenever smooth, monolithic floors are required to prevent chemicals, bacteria, moisture, dirt or pathogenic substances to penetrate into seams.
- Whenever clean-room conditions, resistance to isotope contamination etc. are required.
- Whenever floors are subject to steam cleaning, pressure washing or frequent flooding with antiseptics containing liquids or to solvents from electronic assembly.
- Whenever floors are subjected to exceedingly heavy traffic.
- When installations are made on elastic sub floors, such as wood or plywood.
- Whenever flooring is subject to great thermal variations, such as large sunlight exposed areas, behind curtain walls or over radiant heated sub floors.

Welding may be omitted:

Welding is optional for Euro-flex™ Conductive Tile when the following conditions apply:

- **Excessive water** (or antiseptics containing water) is **not used in maintenance**
- **Sealed seams are not required for chemical resistance and hygienic reasons.**

Example of installations where welding of ESD euro-flex™ tile is optional:

- Light manufacturing or electronic assembly facilities not subject to heavy rolling loads and liquid pressure cleaning.

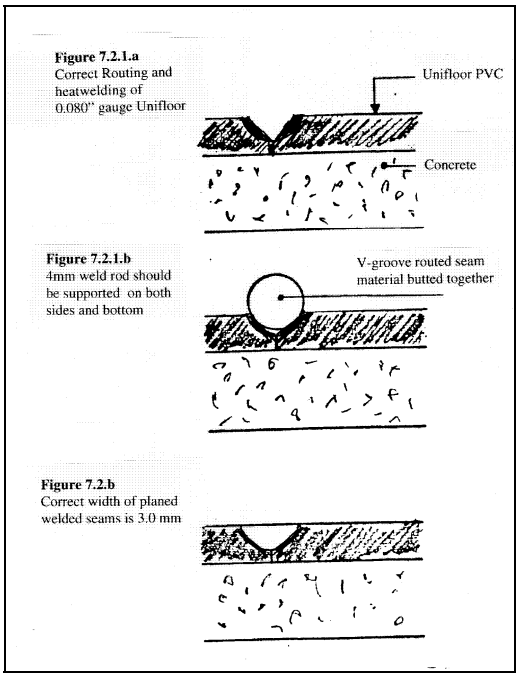
6.2 Choice of welding method

6.2.a Heat-welding is specified for all ESD Unifloor(R) **sheet** flooring materials used on floors or stairs. The Manufacturer provides 4 mm (.16”) welding rods to match colors and properties of each ESD Unifloor(R) or ESD Euro-flex™ system. Heat welding creates the strongest and densest permanent bond when applied to properly V-groove routed and tightly fitting seams.

6.2.b. Chemical welding methods may be employed **only** for ESD Unifloor(R) products installed on walls or when welding to (cove base) Profiles.

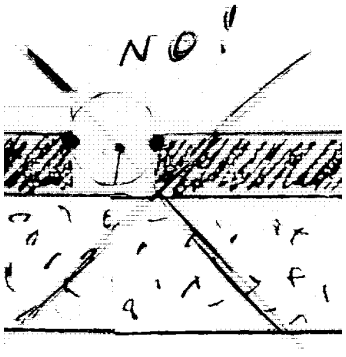
6.2.a.1. Preparation For Heat Welding - Routing of Seams.

Seams should be butted together, double cut, or under scribed without a gap. **Incorrect seams** result when material is installed with a gap between sheets in lieu of routing and then heat welded (see figure 7.2.a.4). Also an incorrect seam can result if material is routed but a gap of <0.5 mm (0.020") is left between the rolls. Since there is no total support for the round weld rod, the welded seam will lift during plane trimming and subsequently collapse to a concave seam.



Correct Seams Figures 7.2a.1-7.2.a. 3. are butted together, double cut, or under scribed with minimum spaces in between.
V-groove Routing to 66% of depth leaves a maximum seam opening of 3 mm on the face of the flooring. A 4 mm welding rod is consequently totally supported right, left, and bottom.

Fig. 7.2.a.4. Incorrect Seams - not routed or gap between pieces. Only corners of weld rod are fused to the vinyl.



<u>Incorrect seams are predestined to fail</u> under rolling loads or heavy traffic and defeat the purpose of heat welding.

6.2.a.2 Routing

Routing should be done not more than 30 minutes before heat welding in order to prevent construction dust or other contaminants from settling into routed seams (which could lead to separations of the welding rod from seams.) The proper V-groove routing technology is of the utmost importance.

- Homogeneous PVC Unifloor(R) 2.0 mm (0.080"gauge) or 2.5 mm (0.1"gauge) products should be V-groove routed to a depth of 65-70 % of the total thickness of the flooring. The widest width of the routed seams should never exceed 3.0 mm (0.12").

Fig. 6.2.a.5 Hand Grooving Tool

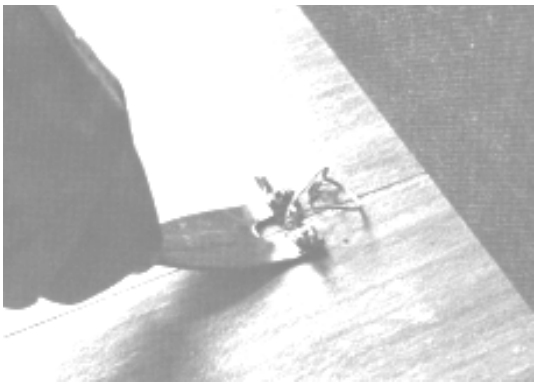
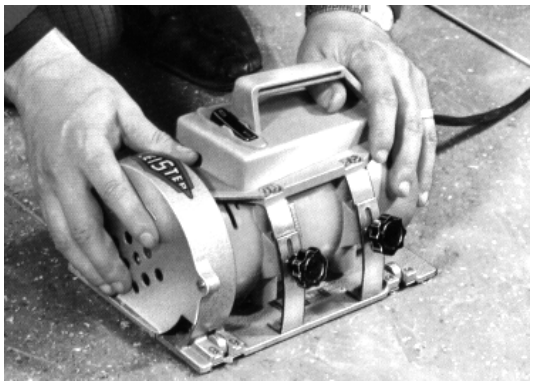


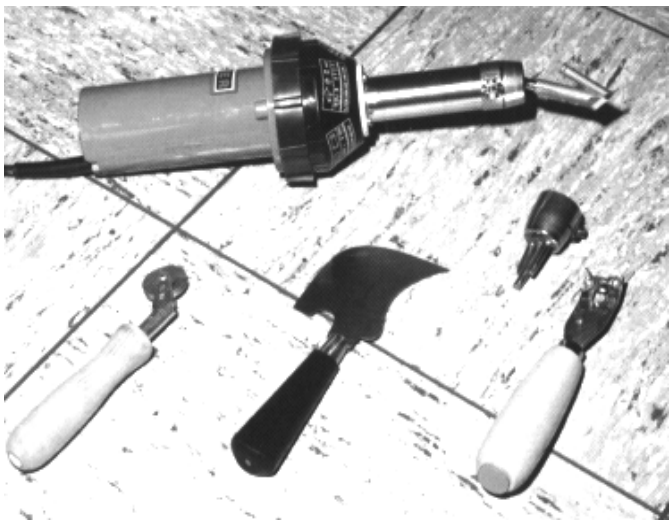
Fig. 6.2.a.6 Leister Fraesrex(R) Router



6.2.a.3 Heat welding

Flooring installed with liquid adhesives UZIN KE 2000 SL Conductive Adhesive must allow for adhesives to dry and cure for at least 12-24 hours prior to attempting welding Seams must fit tightly and may not contain voids. Installations using Sigaway(R) Original or Sigaway(R) Electronic may be heat welded immediately.

6.2.a.3.1 Leister Hand Welding Tool Kit



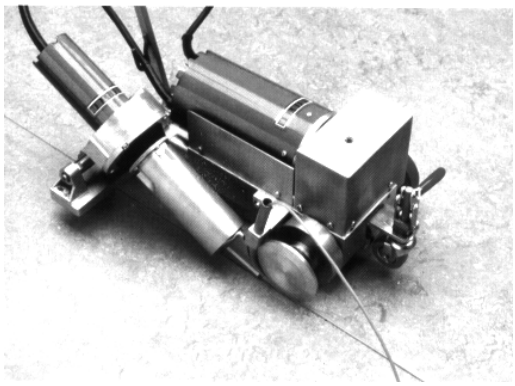


Fig. 6.2.a.3.2 Leister Automatic Welder available with automatic

(includes Hot air Welding Tool with Speed Welding Nozzle, Feed Roller, Grooving Tool, Triple Nozzle, and Half-moon Knife for the planing of Welding Rod)

Note: ESD Unifloor(R) Conductive, ESD euro-flex™ conductive or ESD Unifloor(R) **S**tatic Dissipative must be welded with welding rod **matching the chemical properties** of these products.

Prior to attempting welding, heat up the hot air gun. When welding, the surface of the routed groove and the welding rod are heated up to about the same temperature 230-280°F (110-140°C) with the hot air welding gun. Using a roller or the nozzle of the heat welding tool, the molten welding rod is pressed carefully into the grooved seam.

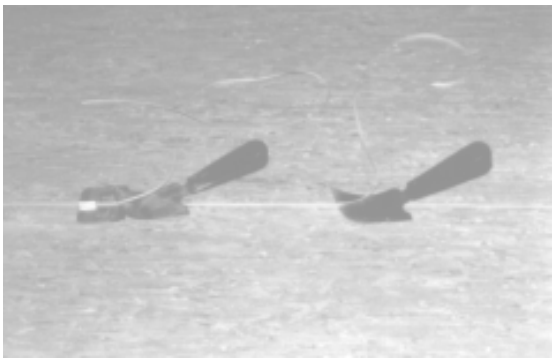


Fig. 6.2.a.3.3 Trimming Welding Rod

After allowing a partial cooling of the welded seam, excess welding rod is planed (cut off). Planing may be done with a hand chamfering tool and special spatula. It is recommended to sharpen the spatula only on the top of the blade to avoid cutting into the Unifloor(R). Experienced installers can plane hot air welded seams in one pass once the material is cold.

Caution: When welding, avoid the creation of hollow sections!

7. Chemical welding

Chemical or cold welding may only be used for installation on walls.

Seams must be very carefully cut or butted together because chemical welding cannot hide cutting defects on seams, or any open gaps.

Chemical welding should not be attempted for at least 24 hours after installation with liquid adhesives. Welding fluid is applied from flexible polyethylene bottles or tubes equipped with specially developed nozzles. The welding fluid forms a permanent bond with the adjacent flooring, which fully cures within about 2-3 days.

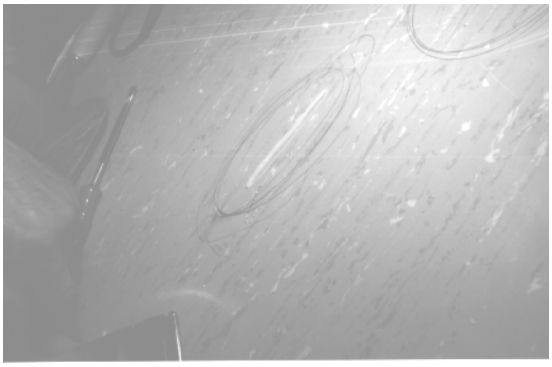
The nozzle is positioned at the bottom of the seam, and welding fluid is pressed by hand out of the polyethylene bottle and allowed to fill the seam. The installer moves the nozzle away from the starting point, controlling the flow pressure and speed so that the seams fills evenly, and a slight excess of fluid rides on top of the seam. If necessary, the seams may be pushed together at this time, and any excess drops of chemical welding fluid may be removed after approx. 5 minutes by blotting with a soft clean cloth and pulling the drops away, avoiding rubbing of the seam. After completion of the cure, any voids may be filled in with a second application. Shiny marks maybe removed after curing by rubbing with a nylon pad. Excess chemical weld may also be left to dry on the surface, but neither seams nor areas containing excess fluid may be exposed to soil or subjected to traffic for at least 3 hours.

Chemical weld may not be diluted. It has a shelf life of about 3 months in polyethylene bottles, longer if used from tubes or if transferred to glass bottles. The nozzles are to be closed off with needles immediately after each use.

8. Repairing ESD Unifloor(R) Installations

Damages on any ESD Unifloor(R) installation can be repaired easily and invisibly. It is important for the project owner to reserve adequate yardage (about 1%) of each ESD Unifloor(R) product and color used on the project for future repairs.

Easy Steps To Repair



Use a utility knife to diagonally shave off the edges from the defective area. Use a new piece of matching Unifloor(R). Preheat the defective area and the new piece of Unifloor(R) patching material.

Fig. 8.1. Diagonally Cut Perimeter of Damaged Section

Fig. 8.2. Using A Tool To Heat-Putty Insert a Section of New Flooring

The heated patching piece of Unifloor(R) will act as a plastic putty. Using a large screwdriver or similar, work in the patching piece of Unifloor(R) until all voids are filled. Let the repaired area cool down (10 minutes.) Rough trim any material exceeding the height of the flooring carefully from the center of the patch to the outside of the repaired area, using a half-moon knife and plane in a second operation.

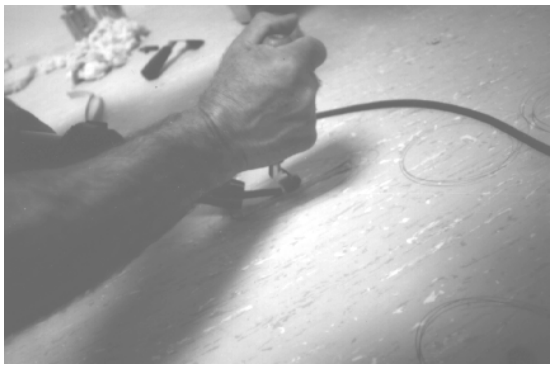


Fig. 8.3. Using Roller to Insert Repair Piece
After the repaired section is leveled with the half-moon knife and the wood scraper, it may be dry buffed. Color differences will disappear after 1-3 buffings.

Fig. 8.4. After Cooling, trim excess repair piece flush with half moon knife and wood scraper.

Fig. 8.5. Fine Level Repaired Section With A Wood Scraper
After the repaired section is leveled with the half-moon knife and the wood scraper, it may be dry buffed. Color differences of the repaired area will disappear after 2-3 buffings.

Fig. 8.7. Repairing of a Burn

Burns may be simply scraped off with a wood scraper and polished by dry buffing. Even repeated burns in the same area may be repaired in this fashion because Unifloor(R) is homogeneous in pattern and density throughout.

Repairing Large Damages in ESD Unifloor(R) Installations
Large damages are best repaired by overlaying and double cutting a diagonal piece of Unifloor(R) matching material, and removing the damaged diagonal piece. Then apply contact cement to floor and new diagonal patch, let contact cement dry, insert the diagonal patch, groove and heat weld the new diagonal piece.

9. The Cleaning and Maintenance of ESD Unifloor(R) and ESD Euro-flex™ Installations

Please download Cleaning and Maintenance Procedures from Technical Data Section of www.tekstilconcepts.com

Unifloor® and ESD euro-flex™ floors(R) have an extremely dense surface which requires no application of waxes and sealants. Coarse dirt should be removed by wiping with a soft broom or by vacuum cleaning. Localized marks can be treated with a machine or with a wet scouring pad. Almost any commercial neutral, non film-forming detergent or cleaning agent may be used for ESD Unifloor(R) surfaces. Avoid cleaning products containing phenolic substances in heavy concentration, acetone, ether or nitrous solvents, as these may cause swelling of the surface.

Spots or spills of chemicals should be removed within 10 minutes to one hour. Prompt localized maintenance minimizes the chance for discoloration.

Wet cleaning is with neutral non-film forming R-50 detergent and water. Manual scrubbing or machine scrubbing may be employed. Dirty water may be mopped up and left to dry. Dry buffing may be employed. Wipe clean methods are suitable.

Note:
Never apply waxes or film residue forming detergent or floor care products to ESD Unifloor(R) Static Dissipative or ESD Unifloor(R) Conductive installations.

Note:
Rubber containing certain antioxidants or anti-ageing additives (as sometimes found on furniture or cart casters) may permanently discolor ESD Unifloor(R). Replace black rubber casters or rubber pads with gray Antistatic Rubber to minimize such discolorations. Flooring stain, solvent based felt pen markers, lipstick, shoe polish and grease based pencils may cause light to strong permanent discolorations.

Please download detailed maintenance instructions from www.tekstilconcepts.com

Appendix to 2.3.5

Installers Company Name, Address, Telephone

MOISTURE TEST R E P 0 R T

Date:
Job Name:

Job Location:

Customer Person to contact:

Moisture Tests Conducted: (List type of test, areas tested, results and dates:

Area Tested (number all test locations)	Type of Test	Date of Test	pH	Vapor Emissions lb./1000 sf.	% rH Relative Humidity

Conclusions & Recommendations:
_____
_____

NOTICE TO CUSTOMER:
Floor covering installations cannot be guaranteed against damage caused by excessive moisture, alkaline substances, or fluid pressure from the sub floor material over which the floor covering installation is made. Testing for moisture prior to installation measures only conditions at the time of and in the areas tested and will not support any warranty against problems caused by excessive moisture that may occur in the future.

Report Prepared by:_____

Date Report Copy Delivered to Customer: _____/_____/201_____

Customer acknowledgment of receipt of Report Copy: _____
(name and title)