

Installation Instructions
1/4" & 3/8" Engineered Products
For Staple-Down & Glue-Down Installations

INSTALLER/OWNER RESPONSIBILITY

Beautiful hardwood floors are a product of nature and therefore, not perfect. Our wood floors are manufactured in accordance with accepted industry standards, which permit a defect tolerance not to exceed 5%. The defects may be of a manufacturing or natural type.

- The installer assumes all responsibility for final inspection of product quality. This inspection of all flooring should be done before installation. Carefully examine flooring for color, finish and quality before installing it. If material is not acceptable, do not install it and contact the seller immediately.
- Prior to installation of any hardwood-flooring product, the installer must determine that the job-site environment and the sub-surfaces involved meet or exceed all applicable standards and recommendations of the construction and materials industries. These instructions recommend that the construction and subfloor be dry, stiff and flat. The manufacturer declines any responsibility for job failure resulting from or associated with sub-surface or job-site environment deficiencies.
- Prior to installation, the installer/owner has final inspection responsibility as to grade, manufacture and factory finish. The installer must use reasonable selectivity and hold out or cut off pieces with defects, whatever the cause.
- Use of stain, filler or putty stick for defect correction during installation should be accepted as normal procedure.
- When flooring is ordered, 5% must be added to the actual square footage needed for cutting and grading allowance.
- Should an individual piece be doubtful as to grade, manufacture or factory finish, the installer should not use the piece.
- Use of appropriate products for correcting subfloor voids should be accepted as a normal industry practice.

TOOLS & ACCESSORIES NEEDED

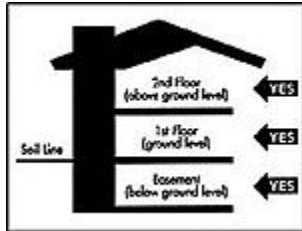
- Broom
- Tape Measure
- Chalk line & chalk
- Hand saw
- Electric power saw
- Moisture meter (wood,concrete or both)
- 3M 2090 Blue Mask Tape
- Hammer
- Recommended Adhesive & Adhesive Remover
- Recommended Hardwood Flooring Cleaner

- Recommended Trowel

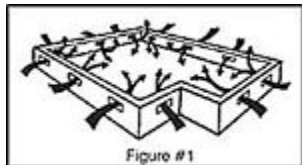
PRE-INSTALLATION PROCEDURES

Job Site Inspection

- The building should be closed in with all outside doors and windows in place. All concrete, masonry, framing members, drywall, paint and other "wet" work should be thoroughly dry.
- The wall coverings should be in place and the painting completed except for the final coat on the base molding. When possible, delay installation of base molding until flooring installation is complete.



- Exterior grading should be complete with surface drainage directing water away from the building. All gutters and downspouts should be in place.
- Engineered flooring may be installed on, above or below grade level. Do not install in full bathrooms.
- Basements and crawl spaces must be dry and well ventilated.
- Exterior grading should be complete with surface drainage directing water away from the building. All gutters and downspouts should be in place.
- Engineered flooring may be installed on, above or below grade level. Do not install in full bathrooms.
- Basements and crawl spaces must be dry and well ventilated.
- Crawl space must be a minimum of 24" (600 mm) from the ground to underside of joists. A ground cover of 6-8 mil black polyethylene film is essential as a vapor barrier with joints lapped six inches and taped. The crawl space should have perimeter venting equal to a minimum of 1.5% of the crawl space square footage. These vents should be properly located to foster cross ventilation (see figure #1).



- Subfloor must be checked for moisture content using the appropriate testing method.
- Permanent air conditioning and heating systems should be in place and operational. The installation site should have a consistent room temperature of 60-75-deg F and humidity of 35-55% for 14 days prior, during and until occupied, to allow for proper acclimation.

STORAGE AND HANDLING

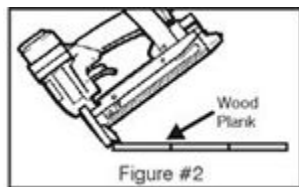
Handle and unload with care. Store in a dry place being sure to provide at least a four-inch air space under cartons which are stored upon "on-grade" concrete floors. Flooring should not be

delivered until the building has been closed in with windows and doors in place and until cement work, plastering and all other "wet" work is completed and dry. Concrete should be at least 60 days old. Engineered flooring should be stored in the environment in which it is expected to perform. Air conditioning/heating systems should be in place and in operation at least 14 days prior, during and after installation of the flooring. Check adhesive label for storage limitations.

INSTALLATION APPLICATIONS

STAPLE-DOWN INSTALLATIONS (DO NOT STAPLE-DOWN PECAN PRODUCTS)

- All 1/4" thick products may be installed with a Stanley-Bostitch LHF Stapler or the Senco SLS20HF regardless of width or number of plies with appropriate adapters or adjustments.
- All 3/8" thick, 3-ply products, 3" wide or less may be installed with a Stanley-Bostitch LHF Stapler or the Senco SLS20HF with appropriate adapters or adjustments.
- Do not install products wider than 3" with a staple down installation system.
- Make sure to properly adjust the gun for proper product thickness (see figure #2).



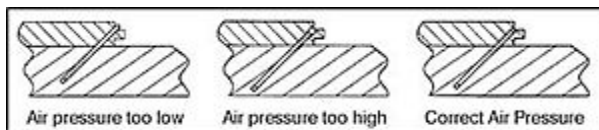
- Use minimum 1" glue-coated staples recommended by the stapler manufacturer.

INSTALLATION USING PNEUMATIC STAPLING MACHINES

NOTE: MINOR SQUEAKING OF STAPLED FLOORS IS NOT ABNORMAL DUE TO STRUCTURAL MOVEMENT CAUSED BY CHANGES IN ENVIRONMENTAL CONDITIONS. FOLLOWING THESE INSTRUCTIONS CAN MINIMIZE THESE FACTORS BUT OFFER NO GUARANTEE THAT THE FLOOR WILL NOT SQUEAK.

General information for stapled applications:

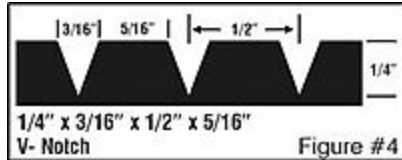
Improper pressure settings and failure to use proper adapters can cause severe damage to the flooring. The correct adapter and air pressure setting will properly set the staple in the nail pocket (figure #3). Low air pressures may fail to properly set the staple and damage adjoining boards.



Air pressures set too high may cause damage to the tongue, preventing installation of adjoining boards and cause blisters on the face of the flooring. Make certain that the compressor has a regulator in-line with the air hose for proper adjustment. Set pressure at 70 PSI to begin with and adjust until proper staple setting occurs. USE A STAPLER DESIGNED FOR THE THICKNESS OF THE PRODUCT BEING INSTALLED. Any water damaged, swollen or delaminated subflooring materials will not hold staples and must be repaired or replaced.

GLUE-DOWN INSTALLATION

- Use recommended trowel (figure #4) to get required spread rate and ridging height.



- Use recommended adhesive (shown in header on page 1).

SUBFLOOR REQUIREMENTS

SUBFLOORS MUST BE:

- **CLEAN** - Scrape, broom clean, and smooth. Free of wax, paint, oil, sealers, adhesives, curing agents and other debris.
- **LEVEL/FLAT** - Within 3/16" in 10' and/or 1/8" in 6'. Sand high areas or joints. If the floor is to be glued down, fill low areas (no more than 1/8" at a time) with a cementitious leveling compound or milk additive latex patch of 3,000-PSI minimum compressive strength. Follow the instructions of the leveling compound manufacturer. Leveling compounds must be tested for moisture to ensure they are properly cured and within the manufacturer's specified requirements for proper installation. When stapling the floor down, flatten low spots with layers of 15# builders felt, plywood or shims.
- **STRUCTURALLY SOUND** - Nail or screw any loose areas that squeak. Replace any water-damaged, swollen or delaminated subflooring or underlayments. Avoid subfloor with excessive vertical movement unless they have been properly stiffened prior to the installation of the wood flooring.
- **DRY** - Check moisture content of the subfloor with a reliable moisture meter.

RECOMMENDED SUBFLOOR SURFACES

Staple-Down or Glue-Down Glue-Down Only

- **PREFERRED:** 3/4" (19 mm) CDX grade plywood
3/4" (23/32") OSB PS2 rated underlayment
MINIMUM: 5/8" CDX grade plywood
- Existing solid wood flooring
- Vinyl, resilient tile, cork flooring
- 3/4" chip, waferboard, particleboard

Glue-Down Only

- Concrete slabs
- Acoustic concrete
- Ceramic, terrazzo, slate and marble
- Cork (Acoustic)
- Metal

CONCRETE SLABS

Glue-Down

Engineered flooring can be glued directly to concrete. Do not use a concrete sealer nor install over one. Surface preparation using mechanical methods such as sanding or scouring with open coat

paper or a titanium disk is preferred. The concrete must be of high compressive strength. All concrete subfloors should be tested for moisture content. Visual checks are not reliable. Acceptable test methods for subfloor moisture content include:

NOTE: Test several areas, especially near exterior walls and walls containing plumbing.

- A 3% Phenolphthalein in Anhydrous alcohol solution. Chip the concrete at least 1/4" deep (do not apply directly to the concrete surface) and apply several drops of the solution to the chipped area. If any color change occurs, further testing is required.
- Calcium Chloride test. The maximum moisture transfer must not exceed 3 lbs./1000 square feet with this test.
- Tramex Concrete Moisture Encounter meter (figure #5). Moisture readings should not exceed 4.5 on the upper scale. (Figure #5 shows an unacceptable reading of over 4.5)



Figure #5

A "DRY" SLAB, AS DEFINED BY THESE TESTS CAN BE WET AT OTHER TIMES OF THE YEAR. THESE TESTS DO NOT GUARANTEE A DRY SLAB. ALL CONCRETE SLABS SHOULD HAVE A MINIMUM OF 6 MIL POLY FILM MOISTURE BARRIER BETWEEN THE GROUND AND THE CONCRETE.

Moisture Barrier System: If moisture is present, inexpensive sheet vinyl or "slip-sheet" (PVC) may be installed. Use a premium grade, alkaline resistant adhesive and a full spread application system to properly bond the vinyl to the subfloor. Follow the sheet vinyl manufacturer instructions for installation procedures. A patch test may be required as an adhesion test. Install several small areas (3' x 3') and allow the vinyl to set for 72 hours. Remove the vinyl; if the backing remains attached to the concrete, the subfloor should be acceptable for sheet vinyl installation. If you have any questions regarding installation or the handling of moisture problems, please contact the distributor/retailer from whom the goods were purchased.

Staple-Down

Install a suitable moisture barrier followed by a plywood subfloor with a minimum thickness of 1/2". The panel must be properly attached to the subfloor using a minimum of one fastener per square foot and more if necessary. Use pneumatic or powder actuated fasteners. Do not hand nail the subfloor with concrete nails.

ACOUSTIC CONCRETE

Glue-Down Only

Acoustic concrete normally contains large quantities of gypsum that may inhibit the adhesive's capability to properly bond. Acoustic concrete must be primed with the concrete manufacturers recommended primer/surface hardener.

WOOD SUBFLOORS & WOOD STRUCTURAL PANEL SUBFLOORS

- **Plywood:** Must be APA grade rated sheathing or CDX minimum.
- **Oriented Strand Board (OSB):** Must be PS2 rated installed sealed side down.
- **Particleboard:** Must be a minimum 40-LB density, stamped underlayment grade and thick.
- **Solid Wood:** Must be T&G, nailed down and less than 31/4" wide.

Staple-Down or Glue-Down

Make sure existing floor or subfloor is dry and well nailed or screwed down every 6" along each joist to avoid squeaking or popping before the floor is installed. The wood subfloor must not exceed 13% moisture content. Measure moisture content of both subfloor and wood flooring to determine proper moisture content with a reliable wood moisture meter. The difference between the moisture content of the wood subfloor and the wood flooring must not exceed 4%.

Optimum performance of hardwood floor covering products occurs when there is no horizontal or vertical movement of the subfloor. The MINIMUM subfloor recommendations described above are for 16" O/C joist spacing. The thicker, PREFERRED subfloor recommendations described above will allow 19.2" joist spacing if the joist manufacturer's recommended span is not exceeded. Spacing in excess of 19.2" O/C may not offer optimum results. Install flooring perpendicular to the floor joists when possible. Installations should not be made parallel to the floor joists or on joist spacing that exceeds 19.2" O/C unless the subfloor has been properly stiffened. Stiffening may require the addition of a second layer of subflooring material to bring the overall thickness to at least 1-1/8".

All underlayment panels should be spaced 1/8" apart to insure adequate expansion space. This can be achieved by using a circular saw set at the depth of the underlayment and cutting around the perimeter of the panel. T&G panels normally have built in expansion; DO NOT cut around the perimeter of T&G panels. Do not install over existing glue-down wood floors. Do not install over nailed floors that exceed 3-1/4" in width. Wide width floors must be overlaid with plywood. When installing over existing wood floors parallel with the flooring, it may be necessary to install an additional 1/4" layer of plywood to stabilize the flooring or install the wood floor at right angles. Applicable standards and recommendations of the construction and materials industries must be met or exceeded.

RESILIENT TILE, RESILIENT SHEET VINYL & CORK FLOORING

Staple-Down

Make sure the vinyl or tile is full spread adhesive and well bonded to the subfloor. Do not install over more than one layer, which does not exceed 1/8" in thickness over suitable subfloor. If vinyl or tiles are loose, crumbled, or in poor condition, install an underlayment directly over the sheet vinyl (linoleum) or vinyl tiles. CAUTION: Some older type tiles become brittle with age. Ascertain that the staple will penetrate these materials and that breakage does not occur. Remove if necessary.

Glue-Down

If the tiles or sheet goods are well bonded, clean the surface thoroughly with a good quality household detergent. De-gloss flooring as necessary to create a good adhesive bond using an abrasive pad. If vinyl appears to have a coating of wax or other maintenance materials, it must be removed with the appropriate floor stripper. Allow ample drying time.

(NOTE: Do not sand any resilient products for they may contain asbestos fibers, which may be harmful.) Do not install over floors that exceed two layers. Cork floors must have all sealers and surface treatments removed before installation begins.

CERAMIC, TERRAZZO, SLATE & MARBLE

Glue-Down Only

All grout joints and broken corners that exceed 3/16" must be filled with a cementitious leveling compound mixed with Latex additive. The surface should be cleaned and abraded to create a good bonding surface for the adhesive. Loose tiles must be re-adhered to the subfloor or filled as above. Remove all sealers and surface treatments.

CORK (ACOUSTIC)

Glue-Down Only

Engineered flooring can be glued directly over full-spread, permanently bonded acoustic cork. The cork should have a density of no less than 11.4 lb./cubic foot and no more than 13 lb./cubic foot. The cork, in general, should be pure cork combined with a polyurethane binder. Cork thickness is to be no more than 1/4" (6 mm). Install cork in accordance with manufacturer's recommendations.

SUBFLOORS WITH RADIANT HEAT

- System must be operational and heated for at least 7 days prior to beginning installation.
- Turn off heat and let subfloor cool down to room temperature 3-4 hours prior to starting the job.
- Radiant heated floors must be temperature controlled or engineered for the R-rating of the floor-covering product installed upon them. BEFORE installation begins, ascertain that the system is designed and controlled for wood flooring. Failure to do so may cause excessive heat damage and shrinkage. Install floor per the application instructions (staple or glue-down).
- **CAUTION:** Refer to radiant heat system manufacturer's precautions for nail down installation. Beware of stapling through radiant tubing or mesh.
- After installation, turn system back on immediately to its normal room temperature setting. The subfloor surface must not exceed 85-deg F throughout the life of the floor.

DOORWAY AND WALL PREPARATION

Undercut door casings. Remove any existing base, shoe mold or doorway thresholds. These items can be replaced after installation. All door casings should be notched out (figure #6) or undercut to avoid difficult scribe cuts.



GENERAL INSTALLATION TIPS

- Floor should be installed from several cartons at the same time to ensure good color and shade mixture.
- Be attentive to staggering the ends of boards in adjacent rows at least 6" when possible (figure #7). This will help ensure a more favorable overall appearance of the floor.



STEP 1: ESTABLISH A STARTING POINT

- Installation parallel to the longest wall is recommended for best visual effects, however, the floor should be installed perpendicular to the flooring joists unless subfloor has been reinforced to reduce subfloor sagging. Find appropriate subfloor from "Subfloor Type" section in this instruction manual.
- Add 3/8" to the widest width of the product being installed to allow for 1/4" expansion and the width of the tongue. For random and alternate width products, use the widest plank for the first row.
- When possible, always begin layout or installation from an outside wall, as these are normally the straightest.
- In at least two places 12"-16" from the corner, measure out equal distance from the starting wall (figure #8) and snap a chalk line.



STAPLE-DOWN INSTALLATION

NOTE: Installation of a 6-mil poly moisture retardant barrier between the subfloor and the wood flooring can reduce expansion and contraction of flooring.

STEP 2: INSTALLING FIRST & SECOND ROWS

- Use the longest, straightest boards available for the first two rows. Align tongue of first row on chalk line. The groove should be facing the starting wall. Pre-drill 1/2" from back (groove) edge, 1-2" from each end, and at 6" intervals when possible (figure #9). Fasten using 4 or 6d finishing nails. Countersink the nails.



- Pre-drill and blind-nail at a 45-deg angle through the tongue of the first row every 3-4" and 1-2" from the ends. Countersink nails to ensure flush engagement of groove with the following row(s). Continue blind nailing using this method with following rows until stapler can be used.
- End-joints of adjacent rows should be staggered a minimum of 6" when possible to ensure a more favorable overall appearance.
- Beginning rows may be blind nailed where clearance allows using a pneumatic brad nailer with 1" brads.

STEP 3: INSTALLING THE FLOOR

- Always use the recommended stapler for the specific product being installed (see "Installation Applications"). Use minimum 1" glue-coated staples recommended by the stapler manufacturer spaced at 3-4" intervals and 1-2" from the ends.
- **IMPORTANT NOTE:** All 3/8" products over 3" wide are recommended for glue-down installation only.
- Set compressor at 70 PSI. If tongue damage occurs, lower air pressure (see figure #3).
- The last 1-2 rows will need to be face-nailed where clearance does not permit blind nailing with stapler or brad nailer. Pre-drill and face-nail on the tongue side following the nailing pattern used for the first row.

GLUE-DOWN INSTALLATION

NOTE: When installing UNFINISHED engineered flooring, allow a minimum of 72 hours adhesive curing time before applying seals, stains and finishes to unfinished flooring. Test the moisture content of the wood in accordance with the stain/finish manufacturer's recommendations.

- Maximum Adhesive Working Times
- Urethane Adhesive - 60 minutes (Always read container label before proceeding)
- Polymeric Resin Adhesive - 90 minutes (Always read container label before proceeding)
- Open times and curing times of ALL adhesives vary dependant upon subfloor porosity, air movement, humidity and room temperature. Urethane adhesive has a shortened work time in high humidity environments whereas polymeric resin adhesive working time will be lengthened. In areas of low humidity, open time will be longer with urethanes and shorter

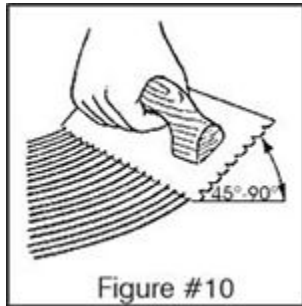
with polymeric resins. Adjust the amount of adhesive spread accordingly. The adhesive should not be applied if subfloor or room temperature is below 65-deg F (20-deg C).

- Spread sufficient amounts of recommended adhesive (shown in header on page 1) with the recommended trowel (figure #4) in an area that can be covered in 60-90 minutes. Polymeric resin adhesives should be rolled every two hours and at the end of the day. If a urethane adhesive is to be rolled, do not do so until the adhesive has cured for two hours.

NOTE: Avoid installing from the surface of the flooring. If necessary distribute weight using a kneeler board.

STEP 2: SPREAD THE ADHESIVE

- Hold trowel at a minimum 45-deg angle (figure #10) firmly against the subfloor to obtain a 50-60 sq. ft. per gallon spread rate. The trowel will leave ridges of adhesive and very little adhesive between the ridges. This will allow you to still see the chalk lines between the ridges and provide the recommended spread rate. If the adhesive skins over and fails to transfer, remove and spread new adhesive to achieve proper bonding to the subfloor. WORKING TIME WILL VARY DEPENDING ON JOB SITE CONDITIONS.



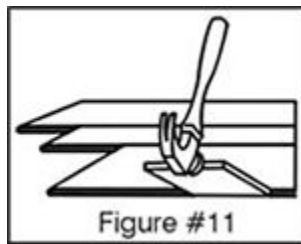
- During the installation occasionally remove a piece of flooring from the subfloor and inspect the back for proper adhesive transfer. Adequate adhesive transfer is necessary to ensure sufficient holding strength.
- or additional application instructions, follow the recommendations on the adhesive container.
- When not in use, keep the adhesive container tightly closed to prevent thickening. Thickening will cause difficulty in spreading the adhesive.
- Proper ventilation within the room must be provided. An electric fan is helpful.
- If the floor is to be covered, use a breathable material such as cardboard. Do not cover with plastic.

NOTE: Clean adhesive from the surface of the floor frequently using the recommended adhesive cleaner. Do not use blue tape before adhesive is removed. Use clean towel, changed frequently to prevent haze and adhesive residue.

STEP 3: INSTALLATION OF FLOORING

- Use the longest, straightest boards available for the first two rows. The first row of planks should be installed with the edge of the groove lined up on the chalk line. The tongue should be facing the starting wall. The first row must be aligned and seated in the adhesive as all additional rows will be pushed back to this original row.
- When installing 5-ply products or products wider than 3", apply a bead of PVA wood glue to all of the end grooves prior to installing into the adhesive.

- When installing pieces, engage the end-joint first as close to side (long) tongue and groove as possible and then slide together tightly to engage side (long) joint tongue and groove. To avoid adhesive bleed-through and memory pull-back, avoid sliding pieces through the adhesive as much as possible when placing them in position.
- Check for a tight fit between all edges and ends of each plank. End-joints of adjacent rows should be staggered 6" when possible to ensure a more favorable overall appearance.
- If necessary, nail a sacrificial row with 1" nails on the dry side of your chalk line to help hold the first row in place.
- It may be necessary to align product with a cut-off piece of scrap as shown (figure #11 - Keep scrap angle low to avoid edge damage).



- To eliminate minor shifting or gapping of product during installation, use 3M 2090 Blue Mask Tape to hold the planks together. After installation is complete, remove all the 3M 2090 Blue Mask Tape from surface of newly installed flooring. Do not let tape remain on flooring longer than 24 hours. Avoid use of masking tape, which leaves an adhesive residue.
- Be sure not to spread adhesive too far ahead of your work area (figure #12).

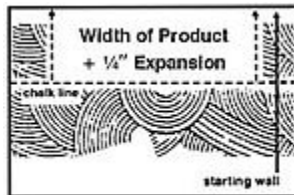


Figure #12

- Complete the installation using this same technique for the remainder of the floor.
- Avoid heavy foot traffic on the flooring for at least 24 hours. Lift the furniture or fixtures back into place after 24 hours.

INSTALLERS - ADVISE YOUR CUSTOMER OF THE FOLLOWING

SEASONS: HEATING AND NON-HEATING

Recognizing that wood floor dimensions will be slightly affected by varying levels of humidity within your building, care should be taken to control humidity levels within the 35-55% range. To protect your investment and to assure that your floors provide lasting satisfaction, we have provided our recommendations below.

- Heating Season (Dry) - A humidifier is recommended to prevent excessive shrinkage in wood floors due to low humidity levels. Wood stoves and electric heat tend to create very dry conditions.
- Non-Heating Season (Humid, Wet) - Proper humidity levels can be maintained by use of an air conditioner, dehumidifier, or by turning on your heating system periodically during the summer months. Avoid excessive exposure to water from tracking during periods of

inclement weather. Do not obstruct in any way the expansion joint around the perimeter of your floor.

FLOOR REPAIR

Minor damage can be repaired with a touch-up kit or filler. Major damage will require board replacement, which can be done by a professional floor installer.

ALL INSTALLATIONS

STEP 4: COMPLETING THE JOB

- Clean floor with the recommended wood flooring cleaner. (See adhesive container for specific information)
- Re-install any transition pieces that may be needed, such as Reducer Strips, T-moldings, or Thresholds. The products are available pre-finished to blend with your flooring. (See moldings below)
- Re-install all base and/or quarter round moldings. Nail moldings into the wall, not the floor. Inspect the floor, filling all minor gaps with the appropriate blended filler.
- If the floor is to be covered, use a breathable material such as cardboard. Do not cover with plastic.
- Leave warranty and floor care information with the owner. Advise them of the product name and code number of the flooring they purchased.
- To prevent surface damage avoid rolling heavy appliances and furniture on the floor. Use plywood, hardboard or appliance lifts if necessary.

MOLDINGS

- **Reducer Strip:** a teardrop shaped molding. Used around fireplaces, doorways, as a room divider, or as a transition between Parquet and adjacent floor coverings that are less thick. Fasten down with adhesive or double-faced tape.
- **Threshold:** a molding undercut for use against sliding door tracks, fireplaces, carpet, ceramic tile, or existing thresholds to allow for expansion space and to provide a smooth transition in height difference. Fasten to subfloor with adhesive and/or nails through the heel. Pre-drill nail holes to prevent splitting. Always leave expansion beneath the undercut.
- **Stair Nosing:** a molding undercut for use as a stair landings trim, elevated floor perimeters, and stair steps. Fasten down firmly with adhesive and nails or screws. Pre-drill nail holes to prevent splitting.
- **Quarter Round:** a molding used to cover expansion space next to baseboards, case goods, and stair steps. Pre-drill and nail to the vertical surface, not into the floor.
- **Combination Base and Shoe:** a molding used when a base is desired. Used to cover expansion space between the floor and the wall. Pre-drill and nail into the wall, not the floor.
- **T-Molding:** a molding used as a transition piece from one flooring to another or to gain expansion spaces. Fasten at the heel in the center of the molding. Leave expansion beneath the undercut on both sides.