

Wall Finishes

Basic Finish Materials

Finishing can be considered as either interior finishing or exterior finishing, using materials that may include cladding, doors, windows, exterior trims, paint, and moldings.

Exterior finishing may be extended to include sidewalks, patios, decks, parking areas and even the landscaping that compliments and completes the building.

While interior finishing will include ceilings, walls, flooring and stairs, it will also include trim, molding, casing, cabinets, and fixtures that meet the owner's requirements and those of the buildings occupants.

Metal Support Assemblies

Metal support assemblies have more often been found in commercial applications than residential although this is rapidly changing as environmental issues influence our building requirements.

The *cold-formed metal studs* are placed at 16" o.c. (on center) or 24" o.c. to accommodate the width and length of common sheathing materials often used in the completion of walls.

Studs carry the vertical load while sheathing or diagonal bracing adds strength to the plane of the wall.

Materials used to finish the wall will determine the fire-resistance rating of the assembly.

Ceiling Support Systems

Metal lath is also used to finish ceilings, as furred metal lath attached to steel joist or as metal lath suspended from steel joists.

When using the first method consideration must be given to the deflection and movement of the structure to prevent cracking of the plaster ceilings.

In the second method, the metal lath is supported by *framing channels* and *furring channels* suspended with wire hangers from the roof.

The channels are usually spaced up to 4" o.c. perpendicular to the joists and the lath is attached to the channels.

Lath and Plaster

Plaster is one of the oldest materials known to be used as a building material.

Some tools used to apply plaster include, floats, screeds, trowels, hawks, scratching tools, hammers, utility knives, nails and lath.

Long before metal lath became common, *wood lath* was used.

Wood lath are narrow pieces of straight-grained wood, usually one inch wide that are cut into short lengths to suit the distances at which the studs were placed.

The lath strips are usually no longer than 4'-5' because the plaster needed a break joint to minimize cracking during the curing process.

Wood laths are butted end to end around the room from floor to ceiling at 3/8" apart.

Gypsum Plaster

Gypsum is a sedimentary rock-like material that is unique in that it can be *calcined* (heated) to give up some of its chemically combined powder and water, then restored to its original form when water is added.

Because of this it can be easily formed into nearly any shape or molded into a form or sheets more commonly known as *gypsum board* (drywall) that are highly fire-resistant and easy to work with.

Plastering is applied in layers depending on the type and strength of the base used.

Gypsum Plaster

The most common form of applying plaster is the three-step process beginning with the *scratch coat*.

The scratch coat is applied directly to the lath between 1/4 to 3/8 inches thick and while still soft is raked so the next coat will have a surface to adhere.

The second coat, known as the *brown coat* is the most important and tedious of the three steps.

Gypsum Plaster

Wall screeds, which are narrow strips of plastering, have to be formed, plumbed and leveled in which to create a form that will be used as a guide that will help achieve a vertical or horizontal surface in which to apply the second coat.

Before finishing, the second coat requires a scouring process that consolidates all the materials, helps harden it and prevents it from cracking.

Then to achieve perfect adhesion with the third coat, the surface is passed over with a wire brush or nail float. The third coat is a *setting coat*, which is about 1/8 inch thick that prepares the wall for further decorating when completed.

Veneer Plaster

In some circumstances a *veneer* plaster, used over “Blueboard”, a drywall whose paper is a blue-gray in color, may be formulated as a finish plaster and added to this process.

Veneer plasters can be used as a thin monolithic base coat over which another finish plaster is applied.

Veneering is sometimes used in place of the taping, spackling and sanding process used by most drywall contractors.

It reduces material costs but labor costs are greatly increased.

Gypsum Board

Gypsum plaster is made into several types of boards used for many different applications. Its major advantage over plastering is time.

Gypsum board is highly fire-resistant and sound resistant when used in walls, ceilings and floors.

When used in partition walls, it is applied from the floor to the ceiling or roofline creating barriers around heating equipment, commercial kitchens and numerous high-risk areas.

It is also used as a fire and sound-resistant agent in areas such as joining walls in restrooms, multi-unit apartment buildings and hospital rooms.

Gypsum Board

Some of the many types of gypsum boards are:

Regular whiteboard---1/4 to 3/4 inches thick; used in residential and commercial applications

Pre-decorated---board that has the finish applied

Green board---contains an oil-based additive in the paper that makes it water-resistant; used in areas such as bathrooms, showers, locker rooms and kitchens where there are high levels of humidity present

Backer board---regular drywall; used where more than one layer of board is required such as between apartments in a building or offices and hospital rooms

Gypsum Board

Core board---1” thick board used in shaft walls to protect electrical, mechanical and conveying equipment, such as elevators and stairwells

Linerboard---has a special fire-resistant core enclosed in a moisture-resistant paper; used in stairwells, corridors, chaseways and shaft walls

Sound-deadening Board---made from wood fibers; used to suppress noise levels

Soundproof Board---a laminated drywall made from gypsum, other materials and dampening polymers

Gypsum Board

Blueboard---forms a strong bond with finish plastering providing water and mold resistance

Mold-resistant Board---paperless drywall; can be used everywhere

Enviroboard---made from recycled agricultural materials

Lead-lined Board---used around radiological equipment

Foil-backed Board---used to control moisture

Controlled Density (Ceiling Board)---available in only 1/2" thickness and is significantly stiffer than regular white board

Fiberboard---strong enough to support weight plus is more fire, sound and moisture-resistant; is also stronger than regular gypsum board, resists impact damage and mildew damage

Cement Board---made with Portland cement; durable, water and fire-resistant backer for tile, slate and stone used in showers, saunas, kitchens, baths, hot tubs and pools

Gypsum Board

During construction, the job is usually split in two.

The “*hangers*” come in first to attach the board to the ceilings and walls and the “*tapers*” or “*mudmen*” will complete the job by finishing the joints and covering the nail heads with drywall compound and tape.

To start a job the hanger will mark out the measurements on the sheet of drywall with a chalk line, cut the board to size by scoring down the front with a utility knife, breaking it backwards along the score, scoring down the break line on the back and finally finishing the break by snapping it forward.

Gypsum Board

The hangers will attach the sized sheet of drywall to the ceiling or wall, making sure to cut out holes for outlets, switches, and lighting. It is then attached to the wall or ceiling with drywall screws.

Nails will “*pop*” (come back out of the drywall) from the constant movement that is common to a structure. Drywall screws support the boards more securely and are less prone to “*pop*” from the everyday movements of a building.

After the boards are attached to the ceiling joists or wall studs, the second crew will conceal the joints by using joint tape and several coats of joint compound. The compound is allowed to dry and then sanded until a smooth finish is achieved and the surface is ready to be decorated with another finish.

Tile

Tiles have been known to maintain their integrity for centuries.

Tiles are hand-made from natural clay or a manufactured composition made of other ceramic materials, quarry stone or metal.

They are relatively thin in relation to their facial area.

Tiles can be textured, smooth, embossed, patterned, sculptured, or engraved and are available glazed or unglazed.

They are available in many types, sizes and shapes and can be cut into nearly any configuration.

Tile

Tiles are fired in kilns at very high temperatures that result in a material that is tough, dense and durable enough to be water-resistant.

A tile is difficult to stain, easy to clean and its colors rarely fade.

Tiles are suited to be used in nearly every facet of construction including residential, commercial, institutional and industrial buildings.

Interior usage of tile can be found being used on floors, walls, ceilings, fixtures and furnishings.

Tile

There are two popular application processes called the thinset process and the thickset process.

The thinset process requires the tile to be bonded to a continuous, stable backing with a thin coat of mortar or an organic adhesive.

The backing should be gypsum plaster, gypsum board or plywood except in wet areas where concrete backerboard should be used instead.

If applying to a masonry surface, it should be clean, in good condition and free of efflorescence.

Tile

In the thickset process, the tile is applied over a bed of Portland cement mortar.

Using a thick bed of mortar allows the tile to be accurately sloped toward drains and away from corners.

Setting bed is from 1-1/4"-2" thick on floors and 3/4"-1" thick on walls.

Either the thinset or thickset process can be used on floors and walls depending on the tile being set.

Terrazzo

Modern day terrazzo is a matrix of mostly marble or granite chips, Portland cement and water or a synthetic resin.

It is placed over a concrete underbed, steel decking or wood sub-floor that is structurally sound.

After this matrix has hardened but not completely cured the surface is ground or chemically peeled to expose the aggregate, then polished to a smooth finish.

Terrazzo provides a dense, extremely durable, smooth surface whose coloring is controlled by the size and color of the aggregates and binder.

Terrazzo

There are four types of toppings classified by their appearance:

Standard Terrazzo with small chip sizes

Venetian Terrazzo, featuring large chips with small chips as fillers

Palladian, made of random fractured slabs of marble up to 15" in length and small chips as fillers

Rustic Terrazzo, a uniformly textured finish in which the matrix is depressed, exposing the aggregates, but is not ground or polished

Terrazzo

There are several accepted systems used to create terrazzo depending on the size of the aggregate chosen for the floor, the weight that the sub-floor will support per square foot, control joint strip locations, panel size and divider locations.

Isolation membranes may be required to prevent the transfer of stress from the sub-floor to the underbed (Portland cement or chemical binder) and topping (terrazzo finish).

Terrazzo

This condition is referred to as being unbonded where a bonded underbed is rigidly attached to the sub-floor supporting the finished terrazzo.

Metal reinforcement is required for the underbed in most cases.

The reinforcement should be corrosion-resistant welded wire fabric at least 16 ga.

Thick with wires spaced no more than 2" o.c.

Terrazzo

Because it is expensive to hand assemble the decorative topping chips for large areas or to create a specific design, the tesserae (stone, vitreous enamel or marble) is assembled in a shop and mounted on paper, then placed on top of the matrix while it is still wet.

After the paper is removed, joints are grouted and the entire installation is ground and polished.

Curing is necessary so that the topping can develop maximum wear properties.

Terrazzo

Materials used for this purpose are polyethylene film, non-staining, non-asphaltic, water-resistant building paper and clean water.

Spray on curing compounds can be used to help cure surfaces except on slabs that are going to use a thinset, chemically bonded or monolithic topping because it may prevent bonding of the underbed and the topping.

To complete the finish, a penetrating sealer should be used.

Stone Facing

When stone is used in interior spaces it is usually applied as a veneer and comes in thicknesses ranging from 1" to 4".

Stones are laid in a bed of mortar and anchored to walls with corrugated metal ties.

Larger stones require at least two wedges be laid under them in each course until the mortar hardens.

Then they are removed and the holes they created are filled with mortar to complete the look.

Stone Facing

Stone with distinctive patterns such as marbles may lend itself to some specific pattern arrangements.

The patterns vary depending on whether the marble is cut with or across its setting bed.

The *Blend* pattern allows panels from a variety of stone to be arranged at random.

The *Sideslip* or *End-slip* pattern uses panels from the same block of stone placing them side-by-side or end to end.

The *End-match* or *Book-match* pattern rotates each of four panels around a central pivot point.

Acoustical Treatment

Controlling sound within a building is critical in the design of our residential and commercial spaces to help maintain a healthy, enjoyable environment in which to live and work.

Acoustics is the science of controlling noise.

Some of the first applications occurred in the design of old opera houses and the now highly technical arenas and concert halls.

Sound control is critical in hospitals and health care facilities, recording and broadcast studios, theaters and media rooms.

More common is the need for acoustical control in multi-unit dwellings, residences and small businesses.

Acoustical Treatment

Acoustics are analyzed from the exterior envelope of the building to the interior and back.

The critical areas of sound transmission come from roofs, eaves, walls, windows, doors and penetrations through these areas for venting or any other purpose.

Sufficient control demands good design considerations based on building usage and building code.

Interior spaces can be enhanced with sound absorbing and reflecting properties used on walls, ceilings and floors.

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Acoustical Treatment

Ideal acoustical substrates are those without a face or finish material that deflects rather than absorbs the sound.

Covering the acoustical substrate with fabrics will heighten the acoustical absorption and improve the quality of the surrounding environment in the process.

Mineral fiberboard is a common substrate used with fabrics, wood or acoustical tile to control the acoustics within the room.

In order to improve and control the acoustics, architects and designers must use materials that deflect and absorb sound, blocking it with wall placement and general layout and covering it up with background sound which is the least disruptive and the most economical.

Acoustical Ceilings

Acoustics includes the generation, transmission and effects of sound waves.

Acoustical materials are used to control these sound waves within a given area.

To help isolate an area and reduce the noise level from the surrounding sounds, the ceiling needs to be built free of any rigid attachment to the building structure.

To simplify it, ceilings should be suspended from rather than attached directly to the roof.

Ceiling isolation hangers isolate ceilings from noise traveling through the building.

Acoustical Ceilings

The *hanger wire* is then attached to this and to a *t-section* for a perforated metal ceiling, to a carrier for a linear metal ceiling or furring channel and to a main runner for a metal pan ceiling.

Sound absorption will depend on the amount of *batt insulation* used above the metal ceiling.

More common grid systems will have a hanger attached to a *cross T* or *T-spline* and main *runner*.

Then the 2'x2' or 2'x4' acoustical panels are slid into the grid system.

Acoustical Ceilings

Acoustical ceiling tiles are made from soft, sound absorbing materials like cork, wood fibers, sugarcane fibers, mineral wool, gypsum, and fiberglass.

Most ceiling tiles are perforated to allow more sound absorption and less deflection.

Another type of ceiling panel is known as a baffle.

Baffles are acoustical panels hung from the ceiling to reduce airborne noise that can be generated in a school gymnasium, auditorium or restaurant.

Other ceiling tiles are designed to be glued, nailed or stapled directly to a gypsum board ceiling or to furring strips attached to the ceiling joists.

Acoustical Ceilings

Suspended ceilings using a grid system are the most common form of installing an acoustical ceiling.

Common suspended ceilings fall into three types; the *exposed grid*, *semi-exposed grid* and *concealed grid*.

Exposed grids have the main runner and *cross runner* exposed.

This type of grid can enhance the ceiling design depending on the finish applied to the grid system.

The semi-exposed system has the main runner exposed but the cross runner is concealed giving the finished ceiling a very linear look with all the parallel lines.

The concealed system has no runners exposed giving the impression that the ceiling is attached to rather than suspended from the roof or ceiling joists.

Acoustical Wall Treatment

The sound absorbing materials and placement of walls within an area help control the effects of sound waves.

Acoustical plaster, used to finish walls, is made with perlite or vermiculite aggregate that is most often sprayed onto the walls rather than applied by hand.

Another spray-on material is a bonding agent composed of cellulosic fibers.

The advantage of these two materials is that they can reach and completely seal a wall surface that is curved or one that is irregularly shaped.

Acoustical Wall Treatment

Another product that is available in many sound-absorbing materials is a wall panel.

Many are made from molded mineral fibers and covered in fabric that is attached to a standard wall surface.

These panels can also be fire-resistant and may be seen in gymnasiums, indoor swimming pools and offices, in the form of cubicles or pre-fabricated walls, or restaurants as dividers and backdrops to name just a few of their uses.

Sculptured acoustical wall units, made from high-density molded fiberglass bonded to a sound-absorbing glass fiber blanket is used as decorative sound-absorbing units and can typically be found in many shapes.

Special Wall Surfaces

Interior walls and partitions in commercial and residential buildings are usually non-load bearing and are there to meet the needs and requirements of the owner and the occupants needs.

Interior walls and partitions may be load bearing as well and can be constructed with wood, metal or masonry.

Many types of finishes can be applied to the framing and that surface may be finished with another more decorative finish.

Walls and partitions function is to divide a building into different areas of usage according to its occupancy and to hide mechanical and electrical equipment that may run through the cavity.

In addition, walls and partitions provide sound-control, fire and smoke protection, insulation, privacy and protection.

Special Wall Surfaces

Specialty walls include firewalls that are built to restrict the spread of fire.

They must extend continuously from the foundation to or through the roof.

This height will be specified by code.

Smoke barriers are fire-resistant continuous membranes that run from one exterior wall to the next and from the floor slab to either the roof or the floor slab above.

Doors in these walls must meet special code requirements and have automatic closers when smoke is detected.

Wood Flooring

Wood flooring needs to be installed properly over sub-floors that may be concrete slabs, OSB (oriented strand board), plywood, or cellular steel floors with concrete slabs.

Be aware of the acoustical requirements, building codes, fire-resistance ratings, heating requirements, traffic loads, color, textures and finish materials specified by the owner or occupancy requirements.

Wood flooring is a finish flooring material made from both hardwoods and softwoods.

The associations that control the grading of wood flooring products specify requirements for kiln drying, grading, control of moisture levels and establish standard sizes for the flooring.

Wood Flooring

Wood flooring is available in *quartersawed*, cut across the grain and *plainsawed*, cut with the grain, and is produced in four basic types: *strips*, *planks*, *parquet*, and *solid end-grain blocks*.

Strips are usually cut to a standard pattern that can be side-matched or end-matched.

The top is usually a bit wider than the bottom so when installed the tops fit snugly and the bottoms are slightly separated.

Strips are usually 2-1/4" wide by 25/32" thick and come in random lengths.

Planks are made the same as strips but come in widths from 3-1/2" to 8" wide.

Wood Flooring

Parquet consists of usually small individual strips of wood or blocks that has been made into a decorative geometric design and is usually installed with mastic.

Solid end-grain blocks come in variable sizes with a 9" block being the most common.

The unit block is made of short pieces of strip flooring that are joined edgewise to form square units.

Laminated blocks use three or more plies of veneer laminated together until the desired thickness is achieved.

Slat blocks use narrow slats of wood preassembled into patterns to make blocks from 9" to 30" in size.

Wood Flooring

Wood flooring is classified as either *solid* or *engineered*.

Solid wood flooring uses the same wood species throughout the entire piece and engineered wood flooring is a combination of a surface veneer that is laminated to one or more plies of a wood veneer from a less expensive wood species that provides stability and strength.

The typical profile is known as tongue-and-groove.

When wood flooring is laid this allows the various strips, planks, and parquet or solid-end grain blocks to be aligned accurately and creates a tight fit with level joints.

Wood Flooring

Wood floors are sensitive to moisture, an underlayment such as building paper or a vapor retarder should be laid over the subfloor first.

All wood should be brought into the room where it is being installed, removed from the packaging and allowed to acclimate to its environment for several days before starting installation.

To begin installation, contractors will chalk line a starting point remembering to allow space around the perimeter of the wall to accommodate the natural movement that the floor will encounter due to changes in temperature and relative humidity.

Then the contractor will start laying the wood flooring at a corner along the chalk line, blind nailing through the tongue that will be facing into the room away from the wall.

This allows the individual pieces to be aligned accurately and creates a tight fit with level joints.

Wood Flooring

The wood flooring may come packaged in random lengths to allow staggering of the end seams so that they will be less noticeable as the floor progresses.

If not, the contractor will take the cut end piece from the first row and use it to start the second row, allowing a natural staggering of the seams.

The wood flooring may be pre-finished by the manufacturer or finished on site.

If already pre-finished, the floor will only have to be cleaned.

If the wood flooring is unfinished, the contractor will need to sand the floor to remove any high spots or roughness in the wood, then clean and stain the wood before applying several coats of a clear polyurethane finish to protect the floor from abrasion, dirt, wear, oxidation, and moisture.

Parquet Flooring

Parquet means pattern and parquet flooring consists of pieces of wood flooring put together to form a decorative pattern.

There are many geometric designs including those that use diamonds, triangles, squares, round and rectangular shapes.

Most parquet floors are formed into a block as a solid unit or as a layer of veneer laminated to a plywood base with adhesive.

Most solid units and laminated blocks are tongued on two adjoining sides or opposite edges while the other two sides are grooved assuring alignment with other blocks to form the larger pattern.

These blocks have the same conditions as any wood flooring. They must be treated as so and installed properly.

Stone Flooring

Stone flooring typically consists of limestone, sandstone, polished marble or granite, and split-face slate.

When using stone flooring there are many factors to consider.

The subfloor must be able to support the weight of the stone because stone is typically ½” thick and weighs about 7.5 psf (pounds per square foot).

Other considerations should be given to the color and texture of the stone finish and its abrasion and slip-resistance.

The stone can be cut and laid in any number of design patterns giving it much versatility.

Stone flooring is laid in Portland cement mortar, the thickset method, much like ceramic tiles.

Resilient Flooring

Resilient flooring is commonly used in all types of buildings as an economical, reliable and long lasting product produced in tiles or sheets.

It is a product that springs back into place after being compressed by being walked on and can easily be cleaned without the use of chemicals or specialty products.

Resilient flooring can withstand most permanent deformations or damage but heavy furniture may cause damage without the use of adequate protection.

Resilient Flooring

When considering resilient flooring, physical properties of the product must be considered.

Appearance and cost are two factors that play an important part in making this decision.

Resilient flooring has a vast variety of patterns, styles, designs, textures, and colors to choose from in either sheet that commonly come in 6', 9', 12' and 15' widths or tiles that are available in 12" to 36" squares.

Resilient Flooring

Resilient flooring is resistant to a number of chemicals, such as alcohols, oils and grease.

Because it is a resilient material, it maintains its integrity and appearance.

Since resilient flooring comes in varying hardness of finish materials, from soft to hard, heavy furniture without proper support under the legs may cause permanent damage to the flooring if the wrong finish is chosen or poor installation of the product is done.

Resilient flooring also has the ability to resist the spread of fire, static electricity and water that makes it one of the top two most used floor coverings.

Resilient Flooring

Resilient tiles are usually made from solid vinyl, a vinyl composition or rubber.

Sheets are made from similar materials but provide fewer, if any, joints in the installation process.

Both tiles and sheets are installed with an adhesive applied directly to the clean and level subfloor whether wood or concrete.

Since the tiles and sheets are thin, usually $3/32$ " , all holes and blemishes in the subfloor must be filled, sanded and leveled before installation of the flooring.

Any debris or abrasive left on the surface of the subfloor can cut through the resilient flooring over time.

Carpet

Carpet is one of the two most popular floor coverings with resilient flooring being the second.

It is widely used in commercial and residential construction because of cost, maintenance and durability.

Carpet is available in nearly every color and a wide range of fibers and textures.

Because it comes in many widths, it can cover a large area quickly, add comfort and warmth to an area and provide soundproofing by reducing noise and sound reflection.

Carpet

Pile fibers are made from both natural and synthetic materials such as wool, a natural fiber, and acrylic, modacrylic, nylon, polyester and polypropylene or olefin, all synthetic fibers.

Wool is a strong fiber with good resistance to damage caused by sunlight, aging, abrasion, and is mildew-resistant as well.

Since most households and businesses replace the carpet within a 5-10 year period, wool is one fiber that with good care can last much longer and be very cost effective in time.

The synthetic fibers share many of the same qualities.

Most are resistant to mildew, fading from the sunlight, aging and chemicals.

They are soft, resilient, soil-resistant and quick drying when having gotten wet.

Carpet

Carpet construction includes woven carpets using the Axminster, loomed, velvet and Wilton methods.

Methods of construction other than weaving are the tufted, knitted, flocked and fusion bonded construction.

Although each is somewhat different from the other, what is common is the terminology used.

Pile yarns are the exposed top of the carpet that takes the wear and tear and are made from the fibers previously mentioned.

The *backing yarns* are made of *weft yarns* meaning the yarn runs the width of the carpet and the *warp yarns* that run the length of the carpet.

Stiffer yarns also run the length of the carpet, adding strength and stability.

Carpet

The *Axminster* construction method is woven on a loom and is cut pile of an even height.

This is what is commonly called a plush carpet.

After a carpet is completed using this method it is so stiff and heavy that it can only be rolled lengthwise.

Loomed construction creates a carpet that has a low-loop single level pile that is bonded to a thick rubber cushion.

Velvet construction can produce a textured surface or tweed effect but cannot produce a patterned design.

The last of the woven carpet methods is the *Wilton* looms that can produce embossed textures or sculptured finishes by adjusting and cutting the pile.

Carpet

Carpet making methods, other than those woven on looms, include the *tufted* construction method that takes the pile and stitches it, much like a sewing machine, onto a backing material.

It is then coated with a latex-bonding agent and attached to a second backing material like coarse jute.

Tufted carpets are available in many different styles.

Knitted carpeting is made by looping the pile, stitching and backing into one operation, then spreading latex onto the back of it to bond it all together and give it added strength.

Carpet

Flocked construction electrostatically sprays strands of pile onto an adhesive coated backing.

As the pile becomes embedded it stands up vertically, then a second backing is added to the whole thing and it is left to cure.

The last method is *fusion* bonded construction where the pile is fed through two sheets of parallel backing then cut in half and divided into two where a second backing is added to each piece.

Carpet

Carpet has to meet specifications established by the Federal Housing Administration, the ASTM (American Standard Testing Materials) and the General Services Administration. These specifications include:

- pile yarn weight (W), which is the average weight of pile yarn in ounces per square yard without any backing
- pile thickness (t) which is the height of pile tufts above the backing in inches
- pile density (D) which is the weight of the pile yarn per unit of volume in the carpet, stated in ounces per cubic yard

Carpet

Carpet is often installed over a cushion to increase the life of the carpet, make it softer to walk on, reduce noise and add insulation.

Some carpets have a cushion attached to the back of them made from foam that often adheres to the subfloor when trying to remove the carpet so it can be replaced.

Cushions are made of urethane foam, cellular rubber, felted animal hair or jute and can be installed over nearly any dry, clean surface including other floor finishes as well as uneven or irregular surfaces.

Carpet

Most residential sheet carpeting is cut to size, stretched and installed using wood tackless strips that have been attached around the perimeter of the room to hold the carpet tightly in place.

Carpet can also be bonded directly to the subfloor with mastic or bonded to the cushion after it has been bonded to the subfloor.

Special Flooring

Resinous flooring has become more popular as the chemical technology that it takes to produce it has improved.

It is applied in its liquid form and when cured provides a uniform surface that is flexible and seamless.

Although the flooring is thin, it has excellent bonding features, is strong and is resistant to impacts and abrasion.

Special Flooring

There are three systems:

Decorative System, where aggregates are combined in an epoxy resin matrix

General Commercial and Industrial Systems that is similar to the decorative system, where the aggregates are combined with a thicker and high performance epoxy

High Performance or Special-Use Systems that is formulated for specific environmental exposures

Special Flooring

Floating floors as laminated hardwood flooring uses a wood veneer with an acrylic topcoat over pressed board or plywood that resists scratching and marring of the surface.

These look so similar to hardwood flooring that it is difficult to tell the difference without close inspection.

These floors “float” over a cushioned water-resistant membrane.

A unique tongue and groove design allows them to snap together easily.

Replacing them is easy when damaged.

They also come in strips, planks and blocks for a variety of styles and finishes besides wood.

Special Flooring

Other floors include cushioned hardwood floors used for gymnasiums, auditoriums and dance studios.

The base is usually concrete covered with a 6-mil vapor barrier, rubber pads on top of the vapor barrier and wood sleepers lay on top of the pads.

To complete the floor, place strip hardwood flooring on top of the wood sleepers.

Special Flooring

Access floors are included in this category.

These floors consist of modular floor panels placed on top of metal adjustable pedestals.

This allows room for mechanical equipment to run underneath the floor as well as overhead.

There are also brick floors, great for sunrooms, kitchens, recreation areas, and rubber floors, used around swimming pools and athletic locker rooms.

Paints, Coatings, and Stains

Many types of paints, coatings and stains exist including oil-based and water-based paints, varnishes, lacquers and special purpose coatings, and oil-based and water-based stains.

There are opaque finishes, transparent finishes, and special purpose coatings that include high-performance coatings, graffiti resistant coatings, fire-retardant coatings, and elastomeric coatings.

Paints, Coatings, and Stains

Paint is an opaque coating made from a mixture of solid *pigment* and a liquid medium.

The liquid medium consists of a volatile solvent (thinner) and a binder that bonds it all together during the drying process.

Applying an opaque coating will hide the grain and texture of the substrate. Roll, brush or spray paint onto the substrate.

Paints, Coatings, and Stains

- ▶ Primer is an opaque coating that must be applied to the bare surfaces of the substrate (wood, drywall, plaster).
- ▶ The primer soaks into the substrate so that subsequent coatings will bind to its surface allowing for better coverage and durability.
- ▶ The intermediate coat is applied over the primer and the top coat finishes the three-step application of paint.
- ▶ Depending on the color, the condition of the substrate and the amount of pigment in the paint that is chosen more than one top coat may be required.
- ▶ In the case of smoke or water damage to the substrate, a sealer that will eliminate the odor from the smoke or the stain that water damage creates can be used before or after the primer coat is applied thereby keeping the odor and stain from bleeding through the final top coat.

Paints, Coatings, and Stains

Paint and other coatings are regulated by the 1992 Residential Lead-Based Paint hazard Reduction Act and the 1970 Clean Air Act.

Lead, found to be hazardous to children and animals, is no longer allowed to be used in paints.

Homes must be inspected for lead paint and contractors who are exposed to lead paint must wear respiratory protection and protective clothes.

The 1970 Clean Air Act regulates the emissions from products that produce volatile organic compounds (VOCs) which include paint and other coatings.

VOCs are any substance that evaporates from paint or other coatings as they dry except for water.

Paints, Coatings, and Stains

To have consistency in a coating, the paint must be applied at a uniform thickness called the minimum wet film (MWF).

The MWF varies due to the spreading rate per gallon of paint.

On the other side, the minimum dry film (MDF) determines how much protection will be provided to the substrate.

Paints, Coatings, and Stains

Many paints can be selected when determining the conditions of the substrate:

- oil-based paints that harden to form a tough elastic film

- alkyd paints that have an alkyd resin added to them

- latex paints that have a binder of acrylic resin

- epoxy paints that have an epoxy resin that acts as a resistor to chemicals, corrosion or abrasion

- rust-inhibiting paints with anticorrosion pigments

- fire-retardant paints with silicone, polyvinyl chloride or other substance

- intumescent coatings that when heated turns into a thick layer of inert foam that slows the spread of flame and silicone resin used in areas exposed to high temperatures

Paints, Coatings, and Stains

Another coating is varnish made from a natural resin dissolved in alcohol (spirit varnish) or oil (oil varnish).

New varnishes available are made from synthetic resins (plastic) like alkyds, polyurethane, silicone, epoxy, acrylics and phenolics.

Natural varnishes fall into three basic types; linseed oil varnishes, tung oil varnishes and spirit varnishes or shellac.

Turpentine, mineral spirits, naphtha and benzene are used as a solvent for varnish.

Varnishes are usually dark in color and can be brushed, rolled or hand-rubbed onto a wood substrate.

Paints, Coatings, and Stains

Lacquer is another synthetic coating that dries with a very high gloss finish.

Most lacquers are sprayed on and many coats are required. It is widely used on cabinets, casework and furniture as a finish.

Special purpose coatings are those formulated to meet a special need such as bituminous, asphalt, reflective and fire-retardant coatings.

Bituminous coatings mix up natural bitumens in an organic solvent that can be used to coat roofs because it is water-resistant.

Asphalt coatings, made from petroleum, have good water-resistance and are often used on driveways and exterior foundation walls.

Paints, Coatings, and Stains

Coatings on signage, stairs and walkways use reflective coatings that absorb light and reflect it back.

Pigmented and intumescent fire-retardant coatings are applied to any type of wood-based substrates and delays contact between the flames and the substrate-giving occupants more time to evacuate.

Stains provide color to wood substrates.

They are blends of oil, driers, resins, a wood preservative, mildewcide, water-repellant, and coloring pigment.

Stains are available as oil based or water based.

Stains can be applied with brushes, rollers or hand-rubbed.

Stains do not raise the wood grain.

Wall Coverings

Wall coverings may include different styles of paneling finished in wood veneer, natural finishes, like marble and granite, leather, or synthetic finishes designed to be used in a variety of usages.

Water-resistant panels can be used in commercial and residential situations.

Wallpaper is another type of wall covering used in both commercial and residential applications.

Wallpaper can be applied to practically any substrate when properly prepared.

Rolls of wallpaper come with the pattern pre-printed on one side and are pre-pasted on the other side.

It is made from many different grades of paper or cloth and the finishes can be anything from a single pattern that does not need to be matched to extremely detailed finishes using natural materials like leaves or dried flowers.