



thecleantrust

Formerly Institute of Inspection, Cleaning and Restoration Certification, (IICRC)

Carpet Cleaning For the Value-Added Technician



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A message from your instructor

When I started in the cleaning industry in 1975 things were a bit different than today. The IICRC (then IICUC) had just begun and probably had fewer than 100 registrants. Training was very hard to find.

Carpet fibers were nylon, polyester and acrylic. Backings were made of jute and the hot colors were avocado, burnt orange, harvest gold, brown and blue. Most popular style was shag. Oh yes disco was king.

The field of cleaning chemistry was in its early stages. In other words pH was king and browning due to those jute backings was an everyday occurrence. The solvents would dissolve most anything oily and rust removers could eat the bone marrow in your fingers as well as cloud glass.

Wands easily weighed 20 pounds and guide handles had not been added yet which left technicians fatigued by lunchtime. Upholstery tools were the size of today's stair tools and if it wasn't a Herculon sofa you could guarantee browning and some shrinkage. If there was a mistake to be made I made it.

Of course everything wasn't bad; my 1975 Chevy van only cost 5800.00 and gas was 50 cents a gallon.

This trip down memory lane is to show how the industry has changed for the better (maybe not the gas and van prices.) Today you have tremendous opportunities with improved training, equipment, chemicals and of course the technology of the internet, mobile phones and social media.

I am here because I would love to help you attain your goals. Whether your goals are financial or the ability to spend your time as you wish, this industry can get you there. Dedication, hard work, attitude, and sincerity in providing a great service are required. These are all under your control.

If you have any questions when you leave this class please contact me at billy@jondon.com or my cell 317 201 7670.

Thanks for being here,
Bill Yeadon

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Timeline History of the Carpet Industry in the US

1791 William Sprague starts first carpet mill in Philadelphia

1839 Erastus Bigelow invents power loom

1845 Alexander Smith builds carpet plant in NY

1849 Jacquard mechanism invented

1877 Bigelow creates first broadloom carpet.

1900 Catherine Whitener sells first chenille bedspread

1926 Karastan Rug Mills open

1930 First mechanized tufting machine created in Dalton

1947 Nylon introduced for carpet

1950 **97 million yards, 10% tufted, 90% woven**

2005 **2.057 billion yards 90% tufted**

Since 2005 the carpet industry has mirrored the economy and in particular the new home industry has caused massive downsizing. Most nylon producers have been sold to carpet manufacturers in particular Shaw and Mohawk.

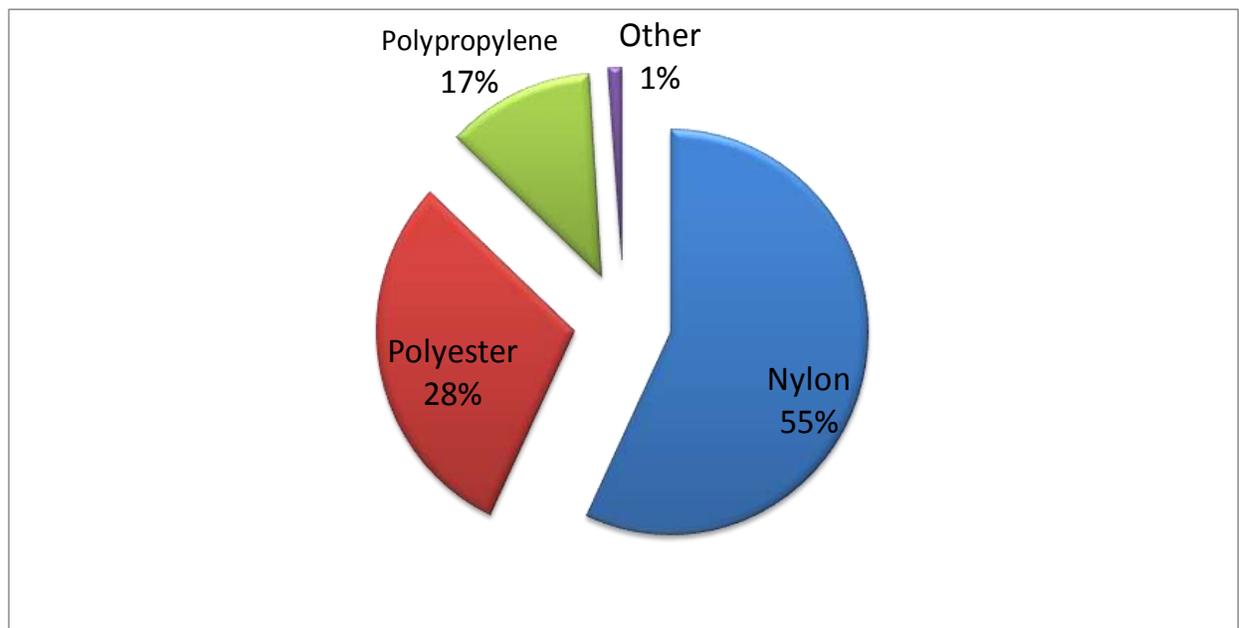
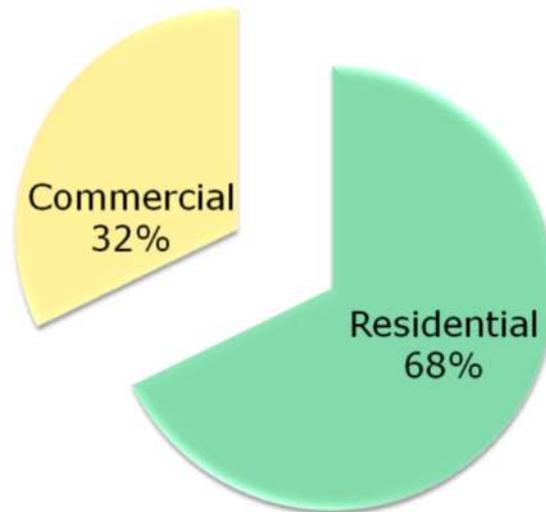
Staple fiber is being replaced by bulked continuous filament (BCF).

Polyester has seen huge growth in market share due to the pricing of oil and the introduction of natural materials such as corn into the production of fiber.

Olefin has lost market share due to demand for some of the petroleum components from other industries.

On the commercial side carpet tile is the dominant product for upscale projects.

Here is what you will be cleaning.



Source: Data from PCI Fiber.

Carpet Fibers

How a carpet fiber performs in a home depends on many things: carpet **construction**, **yarn construction**, type of **installation**, quality and frequency of **maintenance**, type of **cushion** used and type of **fiber** used. Each fiber has different characteristics that do not change. A characteristic that may affect cleaning is how the fiber repels or attracts various soils and stains.

Fibers are broken into two major categories:

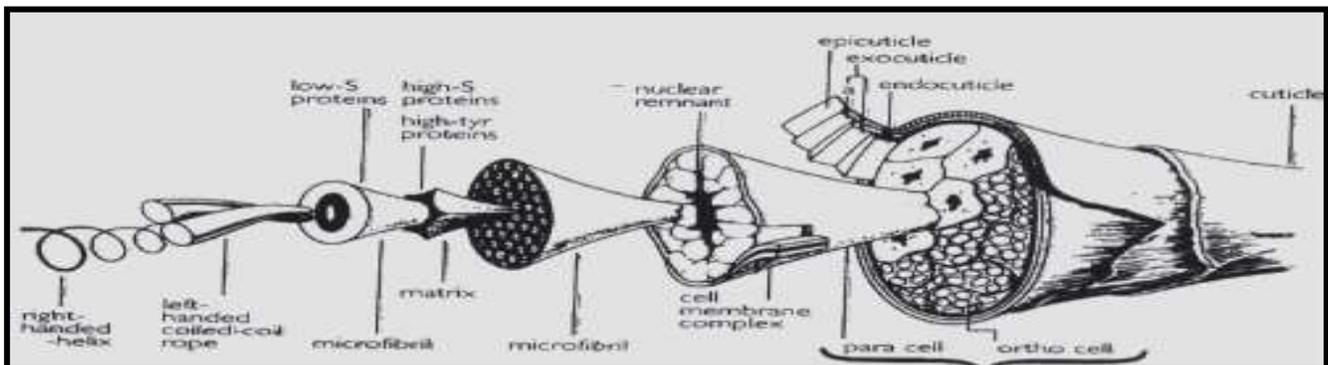
Natural - derived from plants or animals.

- Protein – Wool, Silk
- Cellulosic – Cotton, Jute

Synthetic – derived from petrochemicals or renewable sources.

- Nylon
- Olefin
- Polyester
- Acrylic
- Triexta

Natural and synthetic fibers differ in their ability to **absorb** moisture. Natural fibers have a high absorbency rate while synthetics have a low absorbency factor. This affects how the fibers are dyed and how easily they are stained. One additional concern is drying time. **Natural fibers normally take longer to dry.**



Characteristics:

Wool is obtained from the fleece of sheep.

Characteristics:

- Oldest fiber used in carpet since 2000BC
- Naturally resilient due to **fiber crimp**
- Good abrasion resistance
- Dyes easily
- Cleans well – clean between pH 4.5-8.5
- **Buffered products** may cause damage
- Natural soil resistance, releases soil easily
- Natural protective membrane repels moisture
- Natural fire resistance



Concerns:

- ✓ Excessive alkalinity can damage outer layer (epidermis)
- ✓ Silicones (protectors) can cause resoiling
- ✓ **Chlorine bleach (sodium hypochlorite)** dissolves wool
- ✓ Stains are very difficult to remove
- ✓ Bleeding and crocking are issues
- ✓ Aggressive agitation can damage epidermis, causing felting



Clean with
products tested
as safe for wool



Do not confuse wool Berber with olefin Berber

Silk - normally found only in rugs

Characteristics:

- Obtained from silkworm
- 1 cocoon provides 300-900 meter silk thread
- Most luxurious fiber
- Soft hand

Concerns:

- ✓ Yellowing with age
- ✓ Spots easily
- ✓ Texture distorts easily
- ✓ Damaged by high alkalinity and perspiration
- ✓ Rayon is used as a low priced alternative

Cocoons



Worms feeding on mulberry leaves



Moth



Spinning silk

1. Silk moths lay eggs on specially prepared paper.
2. Eggs hatch and the caterpillars are fed fresh mulberry leaves.
3. After about 35 days, and 4 moltings, the silkworms are 10,000 times heavier than when hatched –now ready to begin spinning a cocoon.
4. A straw frame is placed over tray of silkworms – they begin spinning cocoons by moving their heads in a figure 8.
5. Liquid silk, coated in sericin, is produced in 2 of the silkworm's glands, which is forced through spinnerets.
 - **Sericin:** water-soluble protective gum
 - **Spinnerets:** openings in silkworm's head

6. As this liquid silk comes into contact with the air, it solidifies.
7. Within 2-3 days, the silkworm will have spun 1 mile of filament and will be completely encased in a cocoon.
8. After this entire process, the silkworm metamorphoses into a moth, but is usually killed by heat before it reaches the moth stage – any silkworm reaching the moth stage is used for breeding the next generation of silkworms.

Cotton - used only in rugs and as a backing yarn

Characteristics:

- Dyes easily
- Great hand (feels soft)

Concerns:

- ✓ Easily browns due to high cellulosic content
- ✓ Shrinkage
- ✓ Stains easily
- ✓ Poor resilience



Jute – same concerns as cotton (Sisal, hemp, coir, paper rugs)

Jute is one of the cheapest natural fibers and is second only to cotton in amount produced and variety of uses. Jute fibers are composed primarily of the plant materials cellulose (major component of plant fiber) and lignin (major components wood fiber)



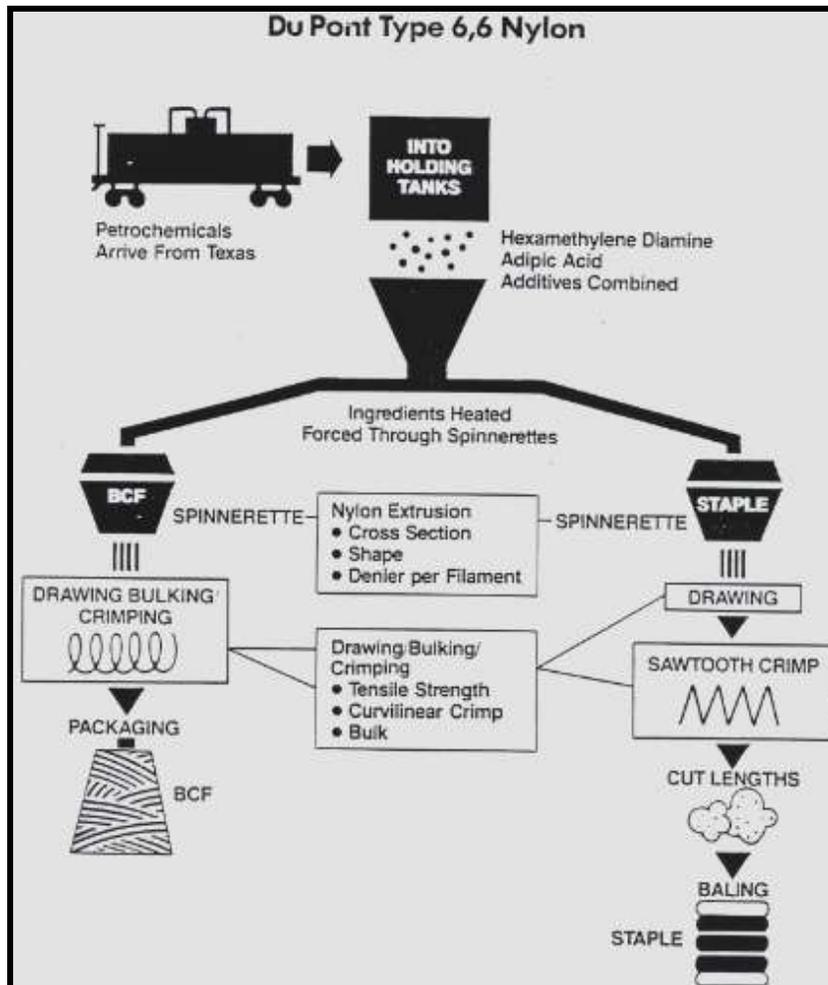
Sisal Rug

Synthetic fibers comprise over 95% of the fibers used in the manufacture of carpet. Two types are BCF and Staple.



All synthetic fibers are manufactured the same way – fiber **extrusion**. Polymer chips are blended and heated to a liquid form, then forced or extruded through a piece of equipment known as a **spinneret**. Spinnerets contain hundreds of tiny holes, which determine the **cross section** of the fiber. The fibers are then cooled in a cooling tower and become solid **filaments**. Each hole in the spinneret produces a filament of fiber. The filaments are then drawn, crimped(which adds bulk to the fiber) and stretched and bulked, resulting in **BCF – bulked continuous filament**, which is wound onto cones and shipped to a yarn facility. The fibers can be cut into 6-8 inch lengths after the drawing process and baled for shipment to a spinning mill.

This is referred to as **staple** fiber and staple is produced from the bales.



Nylon – the most popular fiber used in carpet

Characteristics:

- Great **resiliency** (ability to spring back after compression)
- Accepts dyes better than other synthetics (mostly acid dyes)
- Cleans well
- Resists abrasion
- Dissolves in formic acid

Concerns:

- ✓ Attracted to acid dyes

Generations of nylon – first introduced in 1939 by Dupont

First: round fiber magnified soil

Second: modified shape to trilobal

Third: added property to reduce or dissipate static charge

Fourth: added fluorochemical to resist soil and stains

Fifth: added **acid-dye blockers**(colorless dyes) to repel acid dyes



Fifth generation nylon was first introduced in 1986 by Dupont under the trade name **StainMaster®**. Other fiber producers such as Allied and Monsanto followed quickly with competitive products. Within a few years carpet manufacturers began using their own version of the stain resist technology.

Most of these products have similar warranties stating: **Warranty covers normal indoor residential use for carpets properly installed and maintained in owner-occupied residences. The stain resistance warranty will resist staining caused by most common household food and beverages better than comparable untreated nylon carpet.**

Exclusions to the warranty included:

- ✓ Household cleaners including bleach
- ✓ Pesticides
- ✓ Plant foods
- ✓ Acne medicine including benzoyl peroxide
- ✓ Disperse dyes e.g. mustard, herbal tea
- ✓ Pigmented stains e.g. shoe polish
- ✓ Urine **Sorry Fluffy, not covered**
- ✓ Water damage
- ✓ Residue
- ✓ Heavy use of solvents



Guidelines were established to safeguard the stain resist warranty.

- Cleaning agents should not exceed a **pH of 10**.
- Products should not contain **cationic** surfactants.
- **Silicone** products such as protectors should not be used.

Periodic professional cleaning of the overall carpet is recommended. The frequency of overall cleaning may vary depending on the level and type of traffic and the conditions to which your carpet is exposed, and may range from as little as **6 months to 18 months between cleanings**. The preferred method is **hot water extraction** utilizing cleaning products that are **anionic (negative) or nonionic (neutral) with a pH less than 10**. **Cationic (positively charged) surfactants void the warranty**

Source: Anso® nylon Residential Warranty Information

The fiber producers recommend that spotting be done **after cleaning**. Most spots will normally be removed with a good preconditioner followed by extraction.

When requested to perform a warranty carpet inspection, the technician is to make a report to the requesting party only. The technician should not make any statements to the customer concerning the warranty.

Polypropylene (Olefin) – very popular in Berber style



Characteristics:

- Must be solution dyed
- Most stain resistant
- Excellent fade resistance
- Least water absorbent
- Floats on water due to specific gravity less than water
- Cleans well

Olefin Berbers are especially tricky and prone to wicking. Due to the looped construction, Berbers can hold large amounts of dry soil. Pre vacuum thoroughly, turn down pressure, provide additional extraction passes, and use air movers. In very difficult wicking situations the use of a cotton bonnet may help. Encapsulation may prevent wicking.

Concerns:

- ✓ Poor resilience
- ✓ Low melting point (wrap your couplers)
- ✓ Attracted to oily soils
- ✓ Wicking problems



Olefin is used frequently in commercial buildings that have high tenant turnover. It usually is an extremely low pile carpet and is normally glued directly to the floor. Wicking is a major problem.

Polyester – fastest growing market share

Characteristics:

- Great hand (feels soft)
- Excellent stain and fade resistance
- Good color clarity
- Cleans well
- Dyed with disperse dyes, not attracted to acid dyes

Concerns:

- ✓ Resiliency not as good as nylon
- ✓ Attracted to oily soils, fluorocarbon treatments help

The most common polyester for fiber purposes is polyethylene terephthalate, or simply PET. This is also the polymer used for many soft drink bottles and it is becoming increasingly common to recycle them after use by remelting the PET and extruding it as fiber. This saves valuable petroleum raw materials, reduces energy consumption, and eliminates solid waste sent to landfills.

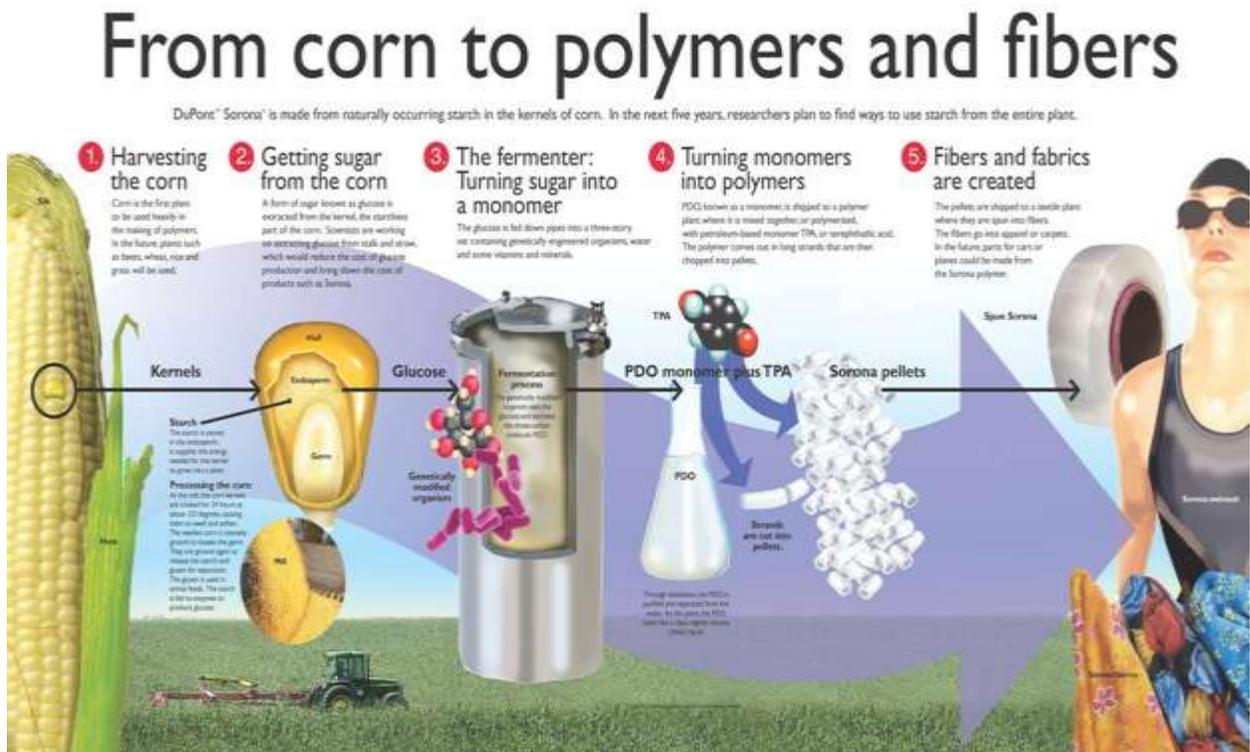


Triexta (PTT) - first new residential fiber since 1960

In the market place this fiber is known as Dupont Sorona and as Mohawk SmartStrand®.

Though triexta carpet fibers have a chemical structure similar to standard polyester carpet fibers, there is a substantial difference between the two. When compared to standard polyester carpet fibers, triexta carpet fibers are incredibly soft and durable and have superior built-in stain resistance that never washes off, making carpet cleaning a breeze. Triexta carpet fibers also have excellent fiber strength and retain their appearance very well without the matting, fuzzing, or piling that some polyester carpet fibers are known for. Time and time again, carpets made with triexta carpet fibers have outperformed standard polyester carpet fibers in independent tests.

These innovative carpets made with triexta carpet fibers are mold and mildew resistant, easy to clean, and dry quickly, resulting in carpets that are kid friendly, pet friendly, and allergy friendly. In addition, Mohawk's SmartStrand® with DuPont™ Sorona® renewably sourced polymer is partially made of renewable, sustainable corn sugar. Using corn sugar reduces the need for petroleum-based products, making Mohawk's SmartStrand® with DuPont™ Sorona® renewably sourced polymer a green, eco-friendly carpet choice.





SmartStrand® carpet deliberately abused for testing purposes. We followed the 5 principles of cleaning to achieve great results. Thanks to my friend Steve Poulos for his help.

Acrylic – originally marketed as the synthetic wool because of its similar characteristics.

Characteristics:

- Always a staple fiber
- Usually solution dyed or stock dyed

Concerns:

- ✓ Poor abrasion resistance
- ✓ Poor soil hiding
- ✓ Poor resilience
- ✓ Fair cleaning
- ✓ Shading

FIBER ID by Burn Testing

| Fiber | Flame | Odor | Ash/Residue |
|----------------------|-----------------------|------------------|----------------------------|
| cotton/jute | orange ember | burning paper | ash |
| rayon | orange | burning paper | no ash or bead |
| wool | orange/sputters | burning hair | black ash/crumbles |
| silk | orange | burning hair | black beads/crushes |
| nylon | blue base/orange tip | plastic/celery | round, black bead |
| olefin/polypropylene | blue base/orange tip | asphalt | round, gray to brown bead |
| polyester | orange sputters black | sweet/fruity | round, shiny, black bead |
| acrylic | white/orange/sputters | acid, burnt meat | black crust can be crushed |

Use butane lighter to avoid sulfur smell of matches. Use a cup or ashtray.

Chemical tests:

Nylon – formic acid

Wool – sodium Hypochlorite

Olefin – floats on water

Review #1

Fibers

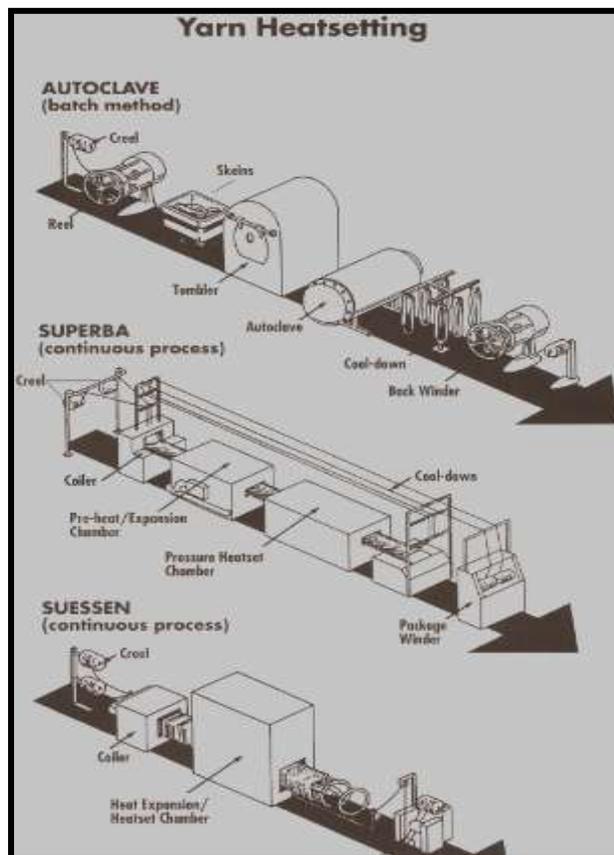
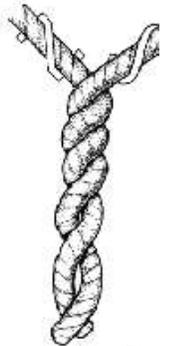
1. *Natural fibers are very _____ which means they take dye easily, stain easily, and take longer to _____.*
2. *The most popular synthetic fiber is _____.*
3. *Olefin loves _____ and hates _____.*
4. *Wool and silk are examples of _____ fibers.*
5. *Nylon can be dissolved by _____ acid.*
6. *Wool does not _____ and smells like a wet _____ when wet.*
7. *The _____ of a wool fiber can be damaged by _____.*
8. *_____ can dissolve a wool or silk fiber.*
9. *Polyester is not a good choice for a _____ building.*
10. *Olefin is always _____ dyed but _____ easily.*
11. *All synthetic fibers are _____ through a _____.*
12. *The _____ fiber is a synthetic substitute for wool.*
13. *Nylon is attracted to _____ dye stains and should be cleaned with a pH under _____.*
14. *When a synthetic fiber is burned it leaves a hard _____ when a natural fiber is burned it leaves an _____.*
15. *When nylon is burn tested it smells like _____, olefin smells like _____, polyester smells like _____, wool smells like burnt _____, cotton or jute smells like _____, acrylic smells like burnt _____.*

Yarn manufacturing

BCF yarn requires only two processes – twisting and heat setting.

Staple yarns resemble wool a natural fiber. They are losing market share to BCF. Because staple or spun yarns need additional processing this adds expense.

- **Blending** insures that the product is as uniform as possible. This helps to prevent dye streaking.
- **Carding** straightens the various fibers and creates a yarn sliver.
- **Pin drafting** continues to blend the fiber and get the fibers as parallel as possible before twisting.
- **Spinning** is the actual formation of the yarn.
- **Plying** is the process where 2 or more yarns (2 ply) are twisted together to form the final plied yarn for tufting. The twisted yarn must **be heat-set to maintain the twist and provide a yarn memory**.



Staple fiber due to its short length **sheds** throughout the life of the carpet but especially when it is new. You or the consumer may notice bunches of fiber in your vacuum bag. This is not a defect.

Dyeing – color is the visual effect that is caused by the spectral composition of light emitted, transmitted or reflected by the object.

Primary colors – *red, blue, yellow*

Secondary colors are blends of primaries.

Methods of dyeing

Pre-dyeing is the application of dye prior to carpet manufacturing. The methods include:

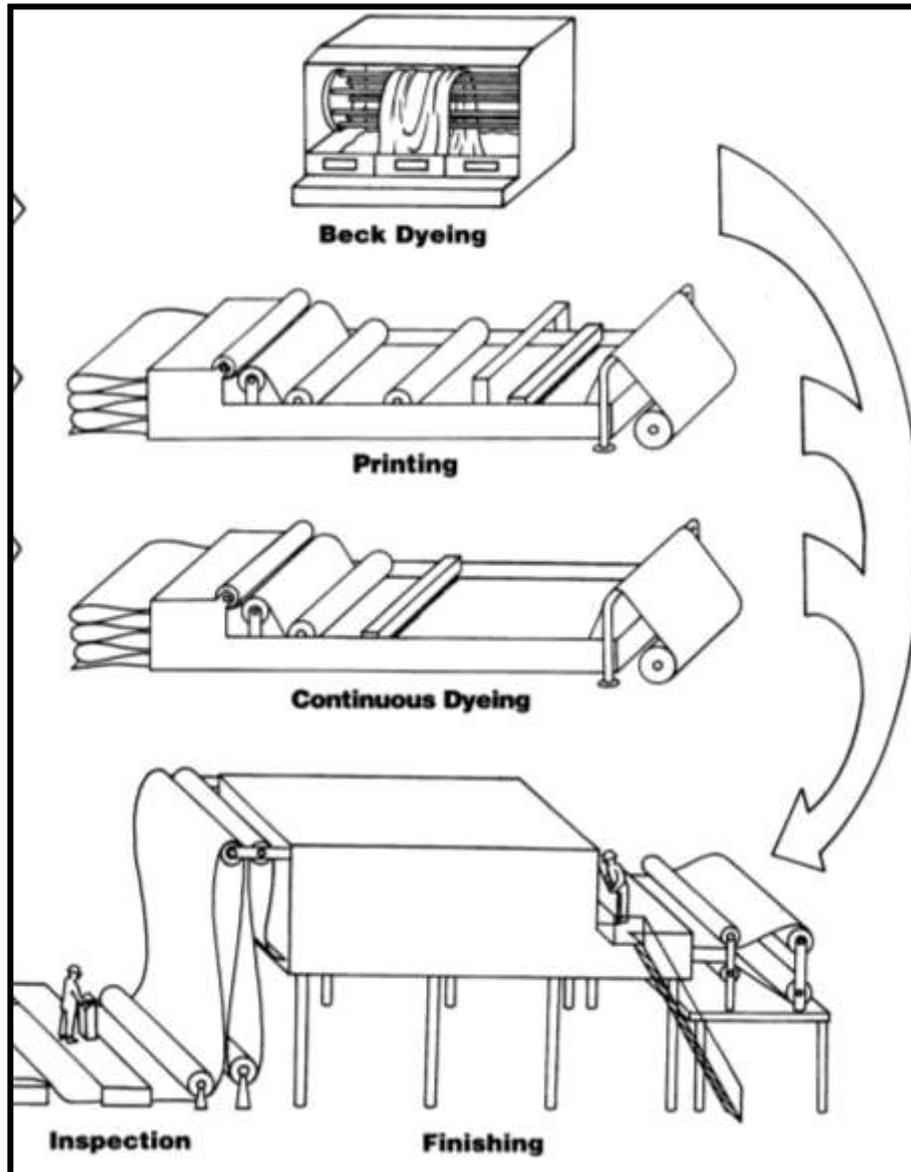
- **Solution** – adding pigment to the liquid polymer before extrusion.
 - **Olefin** must be **solution** dyed while all extruded fibers can be solution dyed. Pre-dyeing represents approximately 30% of residential and 70% of commercial carpet.
- **Stock** – dyeing of fibers in staple form. Used only on wool today.
- **Yarn** – dyed in yarn form before the fabric stage.
 - **Skein, space, and package.** Space dyeing is the application of multiple colors onto yarn.

Post-Dyeing is the application of the dye following the tufting process.

- **Continuous** – a process in which the fabric or greige goods pass through dyeing and subsequent operations without interruption.
- **Beck or batch** – a process in which separate pieces of fabric are handled sequentially through dyeing and subsequent processes.
 - These 2 processes are referred to as *piece dyeing* and are the **most popular** for residential goods.
 - **Differential** dyeing is a variation of piece dyeing whereby the dye being applied is in a dye bath with carpet is constructed with fibers of varying affinities to accept the dye – each color being a different shade.
- **Print** – application of the multiple dye colors in a pattern applied through a screen or rollers. Used frequently in hospitality and restaurants.

**** Some manufacturers prefer a pH closer to neutral when cleaning print carpet. The problem is that printed carpets are popular in restaurants that have infrequent cleaning schedules. Many cleaners choose products with high alkalinity >10 to break down the caked on grease. While this works well it may cause bleeding.

USE CAUTION!



Dye terminology:

- **Pigment** – an insoluble material used to dye fabrics especially solution dyes prior to extrusion.
- **Dyes** – a soluble, color absorbing/reflecting material.
- **Dye sites** – area within the fiber that provides sites for chemical bonding with the dye molecule.
- **Acid dye blocker** – an anionic compound used to block open dye sites in order to eliminate the attraction of acid staining material such as fruit drinks. This is the chemistry behind fifth generation nylon.

Color Loss Concerns:

- **Bleeding** – loss of color by the fabric or yarn when contacted by water, as a result of improper dyeing or the use of poor quality dyes. High alkaline cleaners can increase the chance of bleeding. High temperatures will accelerate the reaction. **When bleeding is a concern leave the carpet in an acid pH state.**
- **Crocking** – the rubbing off or transfer of a dye from a fabric as a result of insufficient dye penetration or fixation. Crocking can occur under wet or dry conditions but requires agitation. A person sitting on a white chair with new blue jeans may leave a blue tint on the chair.
- **Fume fading** – a shade change of a fabric caused by a chemical reaction between dyes and acid gases from fuel combustion, particularly oxides of nitrogen. From gas furnaces. Ozone pollution is also included in this category.
- **Bleaching** – products such as household bleach (sodium hypochlorite), benzoyl peroxide, fertilizers can remove color.
- **Pesticides** – loss of color around room perimeters.
- **Ozone fading** – a powerful oxidizing agent which may cause a loss of color especially blue.
- **Lighter color** – if the color of the stain is lighter than the carpet, it is a loss of color and will need to be redyed or resectioned.
- **Optical Brighteners** – a colorless compound that, when applied to a fabric, absorbs the ultraviolet in light, but emits radiation in the visible spectrum. OB's void carpet warranties and can cause permanent yellowing of the carpet. OB's are often found in detergents.

Various Color Problems:

- **Metamerism** – variation of color under differing light sources when compared to a master sample e.g. sunlight versus fluorescent or incandescent.
- **Pile Reversal** – generally irreversible, localized change in the orientation of the pile yarns of textiles. It can be caused by traffic, shading, watermarking, pooling or the installer turned the carpet 180° at the seam.

- **Shading** – an apparent change in color when the pile is bent and the light reflects differently off the bent fibers. Shading is not a defect and is aggravated when fibers are subjected to abrasive soil and traffic.
- **Watermarking** – an irreversible, localized change in the orientation of the carpet. The phenomenon has different names in different countries. Referred to as pile reversal, watermarking, pooling and shading. Not considered to be a defect.
- **Wear** – a loss of face pile in the traffic areas as opposed to the non-trafficked areas.
- **Side match** – dye lots were not installed sequentially or installed incorrectly.
- **Soil shading** – abrasion of plastic like fibers causing a difference in the way the light reflects.
- **pH indicator dye stains** – imbalance of pH has caused a color change. Adjusting the pH can restore the color.

Backing – once the yarns have been spun it is time to turn them into a carpet or rug. The yarns in a tufting machine are inserted into a **primary** backing. At this stage the fabric is referred to as **greige** goods or an unfinished (undyed) material. The greige goods are dyed and receive an application of latex before being married to a **secondary** backing. The carpet is dried and sheared if needed and it is ready to be shipped.

- **Primary** made from polypropylene or jute.
- **Secondary** made from polypropylene or jute.
 - Applying the secondary strengthens the carpet and provides **dimensional stability** (ability of a carpet to maintain its shape).
 - **Synthetic backed carpets cannot shrink.** Only woven carpets with cellulosic yarns or jute backed tufted carpets can shrink.
- **Woven** backings are composed of warp chain, stuffer warp, and filler or weft yarns, all of which are interwoven with face yarns.
- Vinyl backing is primarily used in carpet modules or 6 ft. wide carpet designed for commercial use. The system uses a layered application of hot vinyl, or plastic compound and fiberglass scrim for dimensional stability (the ability of a carpet to retain its shape.)

Review #2
Yarns & Dyeing

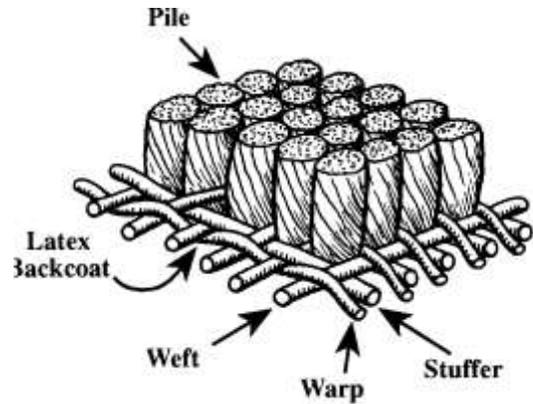
1. *Synthetic fibers are created through a process called _____.*
2. *Synthetic fibers can be either _____ or cut into _____.*
3. *Loose _____ fiber is normal in a cut pile and called _____.*
4. *Olefin can be damaged by _____.*
5. *Olefin and polyester are attracted to _____ soil, this is referred to as being _____.*
6. *Bulked continuous filaments are referred to as _____.*
7. *When 2 or more yarns are twisted together they are called _____.*
8. *A carpet that is dyed in a pattern is called a _____ carpet.*
9. *A carpet that has not been dyed is called _____ goods.*
10. *The most popular form of dyeing for residential carpet is called _____ dyeing. These two methods are _____ and _____ dyeing.*
11. *Wool cannot be _____ dyed.*
12. *A pigment is _____; a dye is _____.*
13. *Optical brighteners can cause permanent _____ and void stain resist _____.*
14. *Pooling, watermarking, and _____ are not considered _____ by the carpet manufacturers.*
15. *Bleeding requires _____ crocking requires _____.*

Carpet Manufacturing

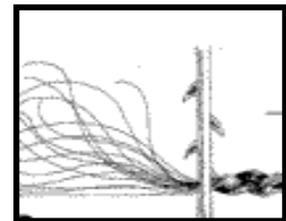
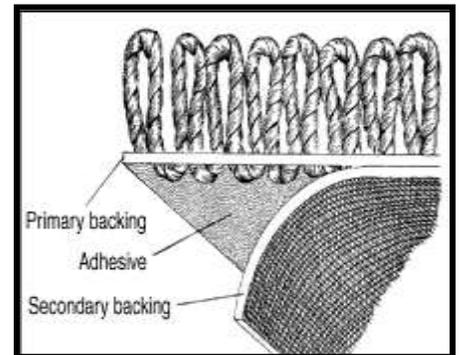
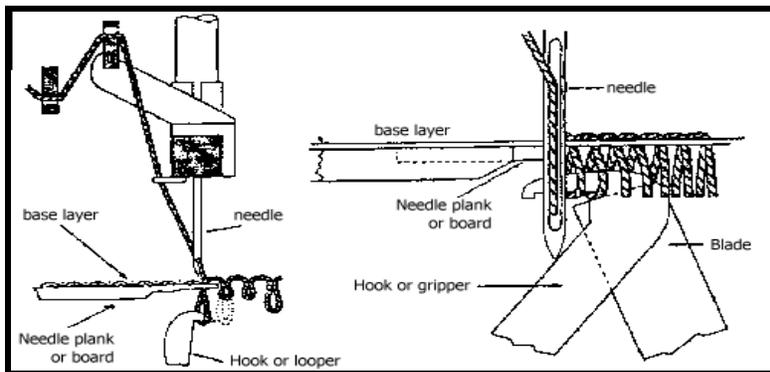
Weaving – method of interlacing two yarns of similar material so they cross each other at right angles to produce woven fabric. Weaving is done on a loom and is much slower than tufting, which makes it more expensive. Woven carpet is distinguished by intricate patterns and is frequently comprised of wool. Two sets of yarn are used; the warp or lengthwise and the weft or filling yarn which is the crosswise yarn.

4 components of a woven carpet

- ❖ Pile
- ❖ Warp
- ❖ Weft
- ❖ Backcoat



Tufting – is the most popular form of manufacturing. Tufting machines resemble a multi needle sewing machine that insert the pile yarns through a primary backing and holds it in place as the needle is withdrawn.



Needle punching – preformed layers or batts of loose fibers are punched by barbed needles into and entangled with, a synthetic backing. Back coated with latex to lock in fibers.

Fusion bonding– a thermoplastic process in which yarns are implanted in a liquid vinyl compound in a sandwich configuration between two backing materials. A knife splits the sandwich to create two cut pile carpets.

Carpet Styles:

Level loop– loops of the same pile height



Multi-level loop- various pile height



Berber– fat loop with colored flecks originally wool but now mostly olefin or nylon.



Velvet/plush – non-heat set cut pile yarns are only slightly twisted and very dense and evenly sheared.



Frieze– a very durable cut pile heat set carpet (either singles or plied) are tufted or woven into dense carpet with a smooth velvet-like pile.



Saxony– cut pile carpet, highly twisted, evenly sheared medium length pile height. Most **popular** residential style.

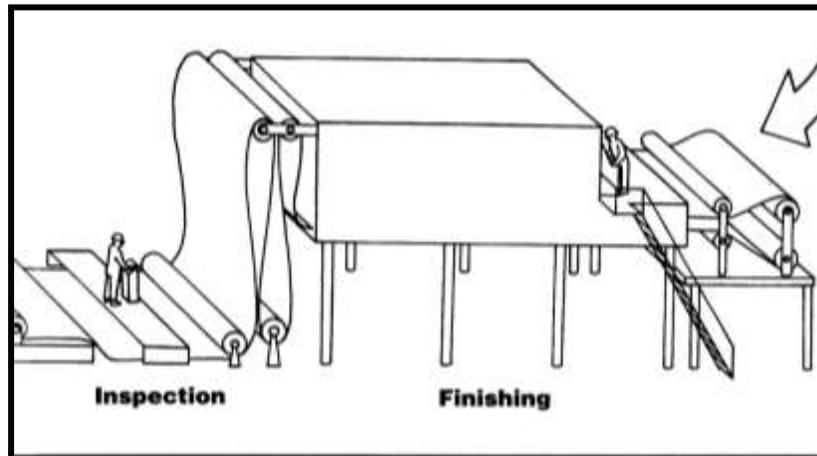


Shag– loosely tufted carpet with long yarns with wide spacing. Shag has overcome the bad press of the late 60's when it was made primarily of single polyester yarns. The yarns tended to crush together creating a very ugly carpet. Today's shags are made primarily of a more resilient nylon. Most styles have a thick cable yarn and a single accent yarn. Modern shags are stylish but very difficult to vacuum and clean.



Carpet Finishing

Once the carpet has been dyed it is ready to go through the **coating** process. Latex is applied to the primary backing as well as the secondary backing. The carpet is attached to the secondary via a marriage roller. The carpet then goes through a dryer so the latex can cure.



The **shearing** process involves the removal of loose or projecting fibers and surface lint from the face of the carpet.

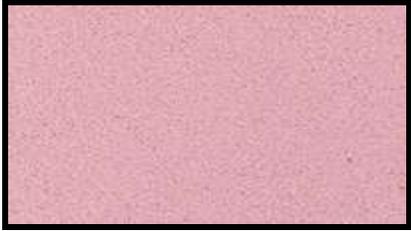
The final step in the finishing process is the **inspection**. Before the carpet is wrapped and sent to the distribution facility it is checked for any visible manufacturing defects.

Carpet cushion/pad

Proper cushion provides several benefits:

- Extends the life of the carpet by preventing matting and crushing.
- Improves the acoustical properties.
- Provides better thermal insulation.
- Vacuuming is easier.
- Safety is enhanced.
- Carpet feels more luxurious.

Types of cushion:

- **Prime** polyurethane foam is a firmer version of the same cushioning used in upholstered furniture, mattresses, and automobile seats. Two liquid ingredients are combined to form a large mass of foam, which is then sliced into sheets for use as carpet cushion.
- **Bonded polyurethane foam** (sometimes called *rebond*) is quite unique. You cannot mistake it when you see it, because it is formed by combining chopped and shredded pieces of foam, in different sizes and usually different colors, into one solid piece. It frequently has a surface net for ease of installation and improved performance.
- **Molding natural or synthetic rubber creates waffled rubber cushion.** Heat cures the rubber and forms a waffle pattern. This variety produces a soft, resilient cushion whose luxurious feel is particularly useful for residences.
- **Flat sponge** rubber is a firm, dense cushion, which has a flat surface and is normally used in large-scale commercial applications and with loop type (or Berber) carpet.
- **Natural fibers** include felt, animal hair, and jute (the material used to make some kinds of rope and heavy burlap bags). This is one of the oldest types of carpet cushion, dating back to the earliest days of machine-made carpet.
- **Synthetic fibers** include nylon, polyester, polypropylene, and acrylics, which are needle-punched into relatively dense cushions which have a firm feel and, as with other types of cushion, can be made in virtually any weight, to stand up under *light*, *medium*, or *heavy* traffic, which is how they are usually classified.
- **Berber** carpet is becoming increasingly popular, and needs a thin, firm cushion. When using this type of carpet, be sure that the accompanying cushion has been specified by the manufacturer as suitable for Berber carpet.

Installation – Having a good knowledge of proper installation techniques prevents paying unjustified claims.

Commercial Carpet

Standard For Installation Specification Of Commercial Carpet, CRI 104 is a definitive industry minimum commercial installation standard.

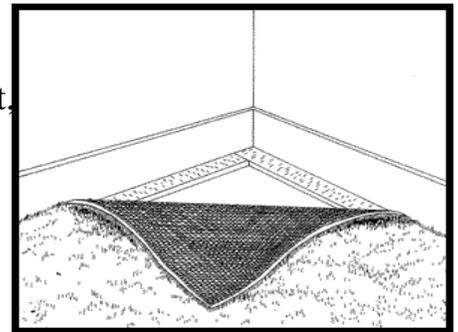
Residential Carpet

Standard for Installation of Residential Carpet, CRI 105 is a definitive industry minimum residential installation standard.

These standards are available free of charge and may be downloaded at www.carpet-rug.org

Installation methods

- **Stretch in** – Provides enhanced underfoot comfort, acoustical properties (i.e., higher noise reduction coefficients and higher impact noise ratings) when installed with separate cushion.



- **Glue down** – carpet is glued directly to the floor.
- **Double Glue-down Installation** - Combines the stability of direct glue-down carpet with the cushioning benefits of a separate cushion, stretch-in installation

Installation Tools

Power Stretcher– required for all stretch in over pad.



Knee Kicker– a positioning tool



Seam sealer – required on all cut seams



Installation concerns

- **Carpet rippling** – caused by failure to power stretch the carpet. Alert the consumer that the carpet should settle to precleaning levels once the humidity has stabilized.
- **Commercial Carpet bubbles** – improper use of solvents, improper adhesive or inadequate amount of adhesive can cause bubbles.
- **Seam separation** – may be lack of seam sealer.
- **Delamination** – separation of primary backing and face fiber from secondary backing.

Causes:

- ✓ Improper specification
- ✓ Improper latex formulation
- ✓ Improper use of solvents
- ✓ Wrong cushion
- ✓ Inadequate latex encapsulation of the yarn (olefin Berber)

Strategies for Improving the Indoor Air Quality

1. Keep walkway and entries clean to eliminate tracking and debris.
2. Use mats to trap soil at entries to protect carpets and reduce the quantity of particles that eventually becoming airborne.
3. Clean shoes at entries to reduce fine particles such as lead.
4. Use quality vacuum equipment. Check the Carpet and Rug Institute's list of vacuums that passed the Seal of Approval Program at: www.carpet-rug.org.
5. Use high-efficiency vacuum filter bags. Small particles can pass through inexpensive paper filter bags.
6. Vacuum frequently before soils become embedded in the carpet.
7. Use quality reusable electrostatic filters for HVAC systems. Remove and flush them free of collected soils monthly.
8. Have the carpet cleaned professionally. To find a certified technician, check with the IICRC at (800) 835-4624 or www.iicrc.org.
9. Clean upholstery, drapery, bedding and other fabric surfaces; wash linens weekly.
10. Control moisture and humidity to keep down dust mites and mold.

**Source: Institute of Inspection Cleaning and Restoration Certification
IICRC**

Common factors that Affect Indoor Air Quality

People (exhalation, body odors, and diseases)

Activities (work such as cleaning, using correction fluids, carbonless paper, pest control products, and personal activities such as wear fragrances and smoking)

Technology (photocopiers and laser printers)

Furnishings (furniture, draperies, floor coverings)

Finishes (paint, varnish, vinyl wall coverings)

Building materials (caulking compounds, adhesives, wood laminates)

Outdoor air quality

Inadequate or contaminated air handling units

Inadequate cleaning practices

Source: Carpet & Rug Institute

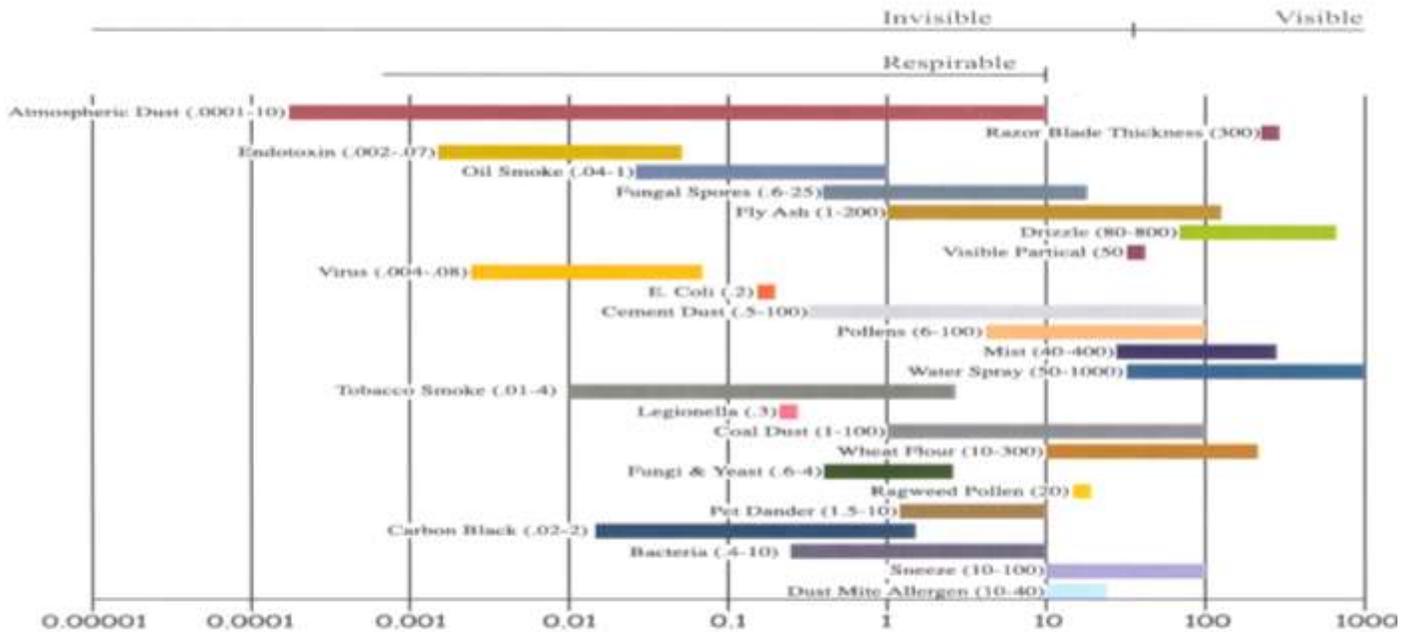
Don't forget to offer your customers a green cleaning alternative. According to a recent Harris Research survey nearly 60% of consumers would be extremely likely, very likely, or likely to purchase cleaning products that are specifically designed to be environmentally friendly.



Review #3
Manufacturing & Styles

1. *Woven carpet is made on a _____ and the yarns consist of a _____ yarn a _____ yarn and a _____ yarn.*
2. *A tufted carpet consists of a face _____ stitched in to a _____ backing with latex bonding it to a _____ backing.*
3. *Most tufted carpet has a _____ backing but some woven carpet has cotton or _____ yarns which can _____.*
4. *The most popular cut pile carpet style is called _____.*
5. *Olefin Berbers can be difficult to clean because of the cleaning wand _____ and excess moisture and soil _____.*
6. *An inexpensive cushion will cause the carpet to _____.*
7. *The most popular style of cushion is called _____.*
8. *All stretched in carpet must be installed using a _____ stretcher.*
9. *The CRI Standard for installation of residential is called CRI _____.*
10. *Tufted carpet must have enough _____ to hold the yarns in and can be damaged by excessive use of _____.*
11. *The separation of primary and secondary backing is called _____.*
12. *Seam sealer prevents the seams from _____.*
13. *A stretch in carpet that ripples normally settles when _____.*
14. *Be careful with solvents on a _____ carpet.*
15. *Download CRI installation standards from www._____.*

Micron Size Range of Pollutants



Data compiled by Professional Testing Laboratory and Carpet and Rug Institute



114 Shallowford Place • Dalton, GA 30701 • 706.226.4383 • Fax: 706.226.4767
Email: protestlab@protestlab.com

1 micrometer is a unit of measurement = 1/1,000,000 of a meter

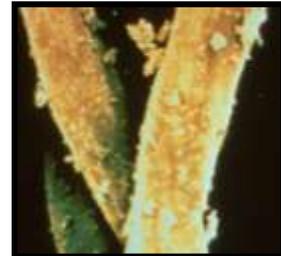
Most soil falls in the 2 micron size

Definition of Cleaning – IICRC S100-02

Cleaning is the traditional activity of removing contaminants, pollutants and undesired substances from an environment or surface to reduce damage or harm to human health or valuable materials. Cleaning is the process of locating, identifying, containing, removing and properly disposing of unwanted substances from an environment or material.

Soil is any unwanted matter on the surface of any object that one desires to be clean. Cleanliness is

an unnatural condition, because all surfaces are constantly being soiled. In order to clean a surface, it is therefore necessary to work against nature and special care must be taken to ensure that all soil is removed and not redeposited on the surface.



Most soil is **acidic in nature** consisting of foods, soft drinks, bodily fluids, acid rain and other materials. The majority of soil is brought in from the outside by foot traffic. Materials such as sand and grit quickly work their way to the bottom of the pile where they can become trapped by compacted yarns. **The majority of this tracked in soil accumulates at the entry points in the home.** Fine particles (0.1 microns) have a significant effect on visible soiling. These particles, although by weight are minimal, actually are responsible for the soiled look of the carpet. Large particles fall to the bottom while fine particles may be trapped in the abrasions and imperfections of the fibers.

- **Real soil** – actual amount of soil in the carpet that can be weighed and measured.
- **Visual soil** – soil that changes the color and luster of the top third of the carpet.
- **Apparent soil** –soil that cannot be removed due to shading and abrasion. This is referred to as graying of the traffic lanes. This should be explained to the customer beforehand.

Shading, pooling, watermarking, pile distortion as well as wear can make traffic lanes look darker even after proper cleaning.

Classes of soils

Insoluble –

| | |
|-------------------------|------------|
| sand, clay, quartz, | 45% |
| animal fibers, skin | 12% |
| cellulose, paper, grass | 12% |
| gypsum, apatite | 5% |
| limestone, dolomite | <u>5%</u> |
| | 79% |

Average adult sheds 300,000 skin cells per day in addition to 300 hairs.

Water Soluble -

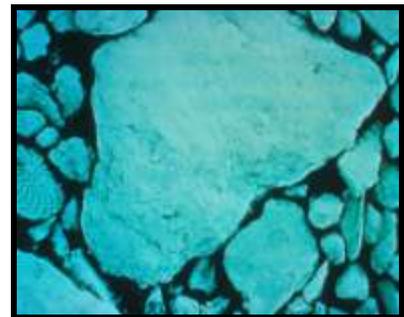
| | |
|------------------------|-----|
| resins, gums, starches | 10% |
|------------------------|-----|

Dry solvent soluble -

| | |
|--------------------------|----|
| fats, oils, rubber, tars | 8% |
|--------------------------|----|

| | |
|----------|-----------|
| moisture | <u>3%</u> |
|----------|-----------|

| | |
|-------|------|
| Total | 100% |
|-------|------|



* Study performed by Hoover Vacuum Company 1953. Also CW Studer

Carpet filters soils, pollutants, gases, and animal dander. Like any filter it needs to be cleaned.

Nearly 80% of the soil is insoluble which means that it does not dissolve in water or solvents. The best and most thorough way to remove insoluble soil is through vacuuming. The **majority of dry soil** accumulates in the entryways.

Principles of Cleaning

The objective of carpet cleaning is soil removal. Cleaning can be accomplished by several methods, but regardless of the method chosen, five principles must be followed to achieve the best results.

Dry soil removal – use of a *CRI Seal of Approval (SOA)* vacuum with a high efficiency filter is recommended.

HEPA (High Efficiency Particulate Air) is a filtering efficiency specification for filters developed by the Atomic Energy Commission during World War II to effectively remove radioactive dust from plant exhausts without redistribution. A HEPA filter must retain all particles as small as 0.3 μm in size with an efficiency rating of 99.97%. The phrases "as small as" or "at" mean that if all particles were that small, it would still have that efficiency. This should not be confused with the phrase "down to" which may mean a mixture of particle sizes for the stated efficiency. Particles smaller than 7 μm are not contained in low-efficiency bags.



Prior to vacuuming if the carpet is matted or tangled in entries, pivot or high-traffic areas a **brush or groomer** should be used to separate the yarns. This will improve the airflow and allow the vacuum to remove more soil.

Vacuuming should be performed in a push and pull motion with a minimum of **6 passes** in heavy traffic areas. The push pass is the positioning pass and the pull is the soil removal pass. Slow down on the pull pass.

Vacuum by hand the **edges** of the room and if the **entry** is heavily soiled hand vacuuming may be required also.

Removing soil when it is dry is a lot easier than removing mud.

Empty the bag when it is **1/2 -2/3 full**.

A truck mounted cleaning unit is not designed to remove dry soil regardless of the power of the vacuum system. Most manufacturers do not recommend the use of their systems for dry soil removal due to possible damage to the blower. The most effective tool will always be the vacuum cleaner.

The importance of vacuuming with a high-filtration bag

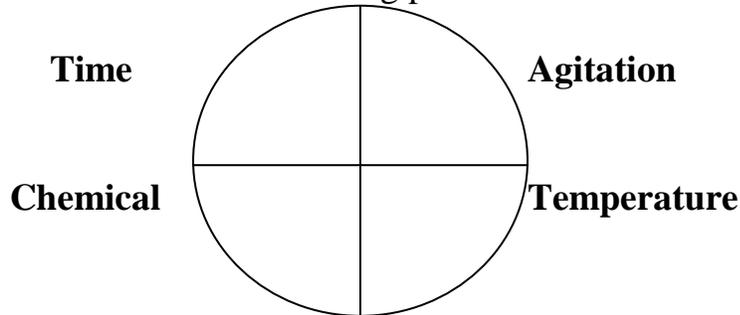
Particle Settling Rates

| | |
|-------|-----------------------|
| <1µm | Permanently suspended |
| 1µm | 8 1/2 hours |
| 5µm | 20 minutes |
| 10µm | 5 minutes |
| 15µm | 2 ¼ minutes |
| 30µm | 34 seconds |
| 50µm | 12 seconds |
| 100µm | 3 seconds |



Soil suspension

Soils that were not removed during the dry soil removal step are suspended from the fiber during this step. This is accomplished through four fundamentals known as the cleaning pie. This is called **TACT** or **CHAT**.



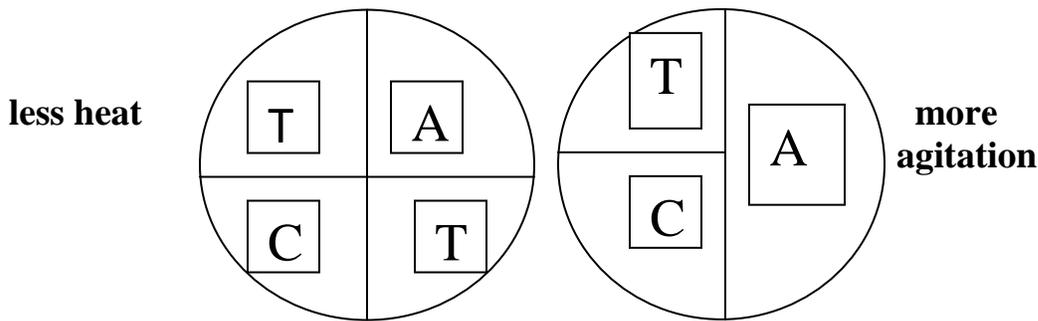
Time – soil that has accumulated over months or years cannot be suspended in a manner of seconds. The preconditioner must dwell for a period of time

to be most effective. The longer the better, but it should not be allowed to dry. On non-colorfast carpet the dwell time should be limited.

Agitation – provides uniform distribution of the preconditioner or detergent. This may be accomplished manually with hand brushing or with mechanical (rotary/cylindrical brush) agitation, as long as adequate detergent lubrication is provided. The agitation helps to lift matted fibers.

Chemical – Detergents, builders and or selected solvents must be used to suspend, emulsify or saponify the various soils. Detergents used on stain-resistant carpet must be anionic or nonionic with a pH not to exceed 10. Detergents used on wool must be within a pH range from 4.5 – 8.5 and should be designed specifically for wool.

Temperature – **Increasing temperature** reduces the surface tension of water, while **it accelerates most chemical reactions**, thereby causing cleaning agents to function more efficiently. Higher heat may reduce the quantity of cleaning agent required, which may result in fewer residues. When one part of the pie is **decreased** one or more of the others must be **increased**



In methods such as absorbent compound heat is missing from the fundamentals. In this case agitation has been increased by the brushing action.

Soil Extraction

Once soils have been suspended they must be physically removed from the carpet. Various cleaning methods accomplish extraction include absorption, wet vacuuming, rinsing or vacuuming of dry detergent residues and suspended soils.

Increased temperature during extraction improves cleaning agent efficiency. Temperature during extraction should be limited to 140 F at the carpet on cut

pile wool, on noncolorfast carpet, and on velvet plush pile designs that might be subject to distortion when extreme heat 160 F plus is combined with high-pressure injection (over 300 psi).

Cleaning processes seek, as a minimum, to sanitize (clean to a generally healthful state) those environments, insofar as possible.

Substances extracted from carpets by any method must be disposed of in accordance with all local, state and federal regulations.



be

Grooming

Grooming is recommended for appearance (removal of wand marks), for uniform distribution of carpet protectors and for proper drying.

Drying

The level of soiling, method of cleaning, temperature, humidity and airflow affect drying.

The goal of every technician should be to have the carpet dry in 4-8 hours, but in a worst-case scenario in 12 hours. The technician is responsible for any overwetting problems.

Carpets that exceed proper drying time could result in slip and fall hazards, odors, and rapid resoiling.



Technicians should **post warning signs** where slip-fall potential exists.

Airflow is necessary to achieve drying. The technician should provide airmovers combined with ventilation throughout the cleaning and drying process. Wicking promotes drying which results in evaporation.



Soils not removed during cleaning may wick to the yarn tips during drying and create dark areas or streaks.

Is your equipment working as efficiently as you are?

Check out these items regularly:

- ✓ Vacuum hoses and hose cuffs
- ✓ T-jets
- ✓ Vacuum blower or fan vacuums
- ✓ Belts on blower
- ✓ Dump valve
- ✓ Lips of the wand

Finally, are you making a sufficient amount of drying passes?

The technician is responsible for the equipment as well as the technique.

That means if there is an overwetting problem the technician is the culprit.

The customer normally has one big question when they call for cleaning.

How long will it take to dry?

Summary of carpet soiling as stated in IICRC S100:

Understanding carpet soil, its ability to accumulate, and its impact both on the life of the carpet investment and on occupant well-being is critical for an appreciation of the important role of the maintenance and cleaning programs. The objective of professional cleaning is to remove as much soil from an occupied environment as practical without damaging surfaces or materials. Cleaning enhances the appearance of a textile floor covering while extending investment life. Moreover, it enhances the well-being, comfort, and productivity of residential and commercial building occupants.

Review #4
Soiling & Principles

1. Soil is normally _____ on the pH scale.
2. The highest percentage of soil is _____.
3. The best way to remove dry soil is by _____.
4. Soil shading is caused by _____ of plastic fibers.
5. The principle of _____ is frequently skipped.
6. The cleaning pie consists of T _____ A _____ C _____
T _____ or CHAT.
7. The second principle is _____ suspension.
8. Extraction can include _____.
9. Water-soluble soils cannot be removed by _____.
10. Hair, sand and skin are considered _____.
11. Empty a vacuum bag when it is _____ to _____ full.
12. A micron or micrometer is 1 _____ of a meter.
13. Fast drying prevents _____ and _____ hazards.
14. A carpet should be groomed to remove _____ and help
the protector be _____ evenly.
15. The _____ is responsible for _____. Some of this
may be caused by lack of _____ maintenance.

Methods of Cleaning

As previously discussed, each method needs to adhere to the five principles of cleaning to achieve maximum cleaning. All methods of cleaning use detergents. The difference is in the carrier used (water, foam, compound) to deliver the detergent. All methods can improve the effectiveness and contribute to the effective removal of biocontaminants by increasing the temperature of the chemical.

The first step in all methods is thorough dry soil removal using a vacuum with a high efficiency filtration system.



Upright



Backpack

Absorbent/Adsorbent Compound

This method may incorporate the use of an organic or synthetic carrier that contains detergents, solvents and a bit of moisture. The compound may or may not be preceded by a preconditioner. The compound can be spread by hand or a specially designed machine. Brushing is used to spread and agitate the compound that absorbs/adsorbs the suspended soil. Following drying the suspended soil and compound is removed by dry vacuuming.



Dry Foam

Dense foam is produced by a dry foam machine through mechanical aeration of a liquid detergent. A preconditioner may or may not be used prior to application of the foam detergent. The foam is distributed and agitated via mechanical brush action. Suspended soil and the foam are extracted by the same machine or with a wet vacuum.

Figure 1 Dry Foam Machine



Figure 1 Rotating Brushes & Extraction

Absorbent Pad (Bonnet /Oscillating Pad)

A preconditioner may or may not be used prior to cleaning. Detergent in either a dry-solvent based or a carbonated or non-carbonated water-based carrier is sprayed onto the pad and the carpet. The pads may be round or square towels made of cotton, rayon, synthetics or a combination of fibers. In place of spraying the pad they may be dipped into a bucket of cleaning solution. During the agitation (spin buffing/oscillating/orbital) phase of soil suspension, the bonnet (pad) attracts or absorbs suspended soils. Technicians must monitor the rate of soil attraction to the pad and turn it over or replace it before the bonnet becomes soil saturated.. When both sides of the pad are soil saturated, it must be exchanged before continuing in order to assure maximum soil removal.



Different pads for different situations

Shampoo

A preconditioner may or may not be used prior to shampooing. Foaming detergent is applied to the carpet nap through a shower head, nylon bristled brush rotating at a speed recommended by the equipment manufacturer that is safe for the carpet being cleaned. The agitation of the brush creates the foam that suspends the soil. Depending on the detergent used, either a wet vacuum extracts the suspended soils and detergents or upon drying the suspended soils and detergents are dry vacuumed. Brushes not properly lubricated with shampoo can cause textural damage to the carpet.

Shower fed or spray with T-jet



A brush or floor pad may be used depending on the carpet. Use caution on cut pile carpet. For extreme soiling a rotary brush followed by Hot Water

Encapsulation

The cleaning agent is brushed into the carpet using a cylindrical or rotary brush/pad machine. The encapsulation chemistry surrounds each soil particle and crystallizes it so it can't attract other soil. The encapsulated particles release from the fiber and are removed through dry vacuuming. This can be accomplished by the cleaner or in-house or contract building services pers



Encapsulation is ideally suited for commercial maintenance especially in office, church, schools and other areas where high productivity, lower costs, and fast dry time is critical. Encapsulation works well to prevent spills from wicking following cleaning.

Hot Water Extraction (HWE)

A preconditioner is normally applied through a pump sprayer, in-line sprayer or by using a rotary shampoo machine. The suspended soil along with the preconditioner is flushed from the carpet with a HWE machine. Heavily soiled carpets may need several flushing passes and followed up with several overlapping extraction only passes.

Complete drying should be accomplished in 6-8 hours, but not to exceed 24 hours. Additional extraction passes; air movers and good ventilation will expedite drying. Over wetting or prolonged drying are normally due to **operator error**.

All extracted solutions must be disposed of according to local rules and regulations. Wastewater should be disposed of into a sewer line leading to a wastewater treatment station.

All methods should be followed by pile setting or grooming as necessary. Nap setting must be accomplished for uniform distribution of all post cleaning treatments.

Understanding the components of an extractor is important to the end result. **HWE** can be broken into two main categories:

- Portables
 - (box & wand)
 - walk behind



- Truck mounts
 - van powered or direct drive/power take off (PTO)
 - slide in units (separate engine)
 - electric

The major difference between the portables and truckmounts is productivity. A few portables have direct water and waste hookups most truckmounts can clean higher volumes of carpet due to greater heat, pressure and vacuum.



Vacuum is measured in two ways:

- Lift measured by inches of mercury (Hg) or water (H₂O) lift.
- Airflow CFM – cubic feet per minute.

HWE cleaning strokes:

Single pass – apply solution on forward stroke and vacuum on backstroke.

Double pass – apply solution on forward and backstroke shutting off solution momentarily at end of stroke. Be sure to give additional vacuum.

Chop stroke – apply solution in short continuous strokes. Be sure to provide adequate vacuum passes when through. Use in heavily soiled areas. Use caution on velvet styles and wool carpet.

Tools for HWE:

The choice of tools has expanded over the last decade. Tools come in all shapes and sizes from the original cleaning wand to several types of power heads. A technician would be wise to try different tools to see which is preferable before purchasing the tool.



Don't forget to change those tee jets regularly.



Safety Issues:

1. Truck mounts that are powered by the truck engine should always be parked so that the exhaust faces away from the home. Fumes are easily drawn into the structure.
2. Truck mounts that use propane heaters should have the propane tanks mounted on the outside of the van. Be sure the valves have been shut off before driving.
3. Replace any solution hoses that are worn to prevent a line rupture.
4. Replace any electrical plugs that are missing the ground plug.
5. Make sure all equipment including wands has been secured in the van before driving. Be sure the back doors are closed before driving.
6. Have a Material Safety Data Sheet (MSDS) for every product on the truck including any household type chemicals. These sheets need to be in a folder accessible by the driver with his seatbelt fastened.
7. Every spray bottle and container must be labeled.
8. Carry and use goggles, gloves and respirators as necessary. When in doubt wear them.
9. Use the proper gauge electrical cords with grounds.
10. Drive safely and cautiously. Remember your company name is on the side of your truck.
11. When mixing chemicals wear PPE and only mix them in your facility or in your van. Never mix chemicals in your customers home.
12. Purchase chemicals from a reputable source and never mix chemicals other than by label directions.
13. Never leave samples of chemicals in unlabeled bottles.

Review #5 Methods

1. *Regardless of the method chosen the _____ must be followed.*
2. *The oldest method of cleaning is _____.*
3. *A very popular interim method for commercial maintenance is _____.*
4. *_____ has the most chances of overwetting.*
5. *Systems using a granular detergent are called _____.*
6. *A system using a foaming surfactant using a cylindrical brush is called _____.*
7. *The method favored by many carpet manufacturers is _____.*
8. *When using an absorbent pad the pad should be changed when it stops _____ soil.*
9. *Systems using rotary action are more likely to cause _____ distortion.*
10. *Propane tanks should be mounted on the _____ of the van.*
11. *All trucks must carry _____, and a fire extinguisher.*
12. *Replace any plugs that are cut or missing the _____.*
13. *Replace any solution hoses that are _____.*
14. *Park your van so that _____ faces away from the home.*
15. *Wicking is minimized in a commercial building with multiple spills when using an _____ system.*

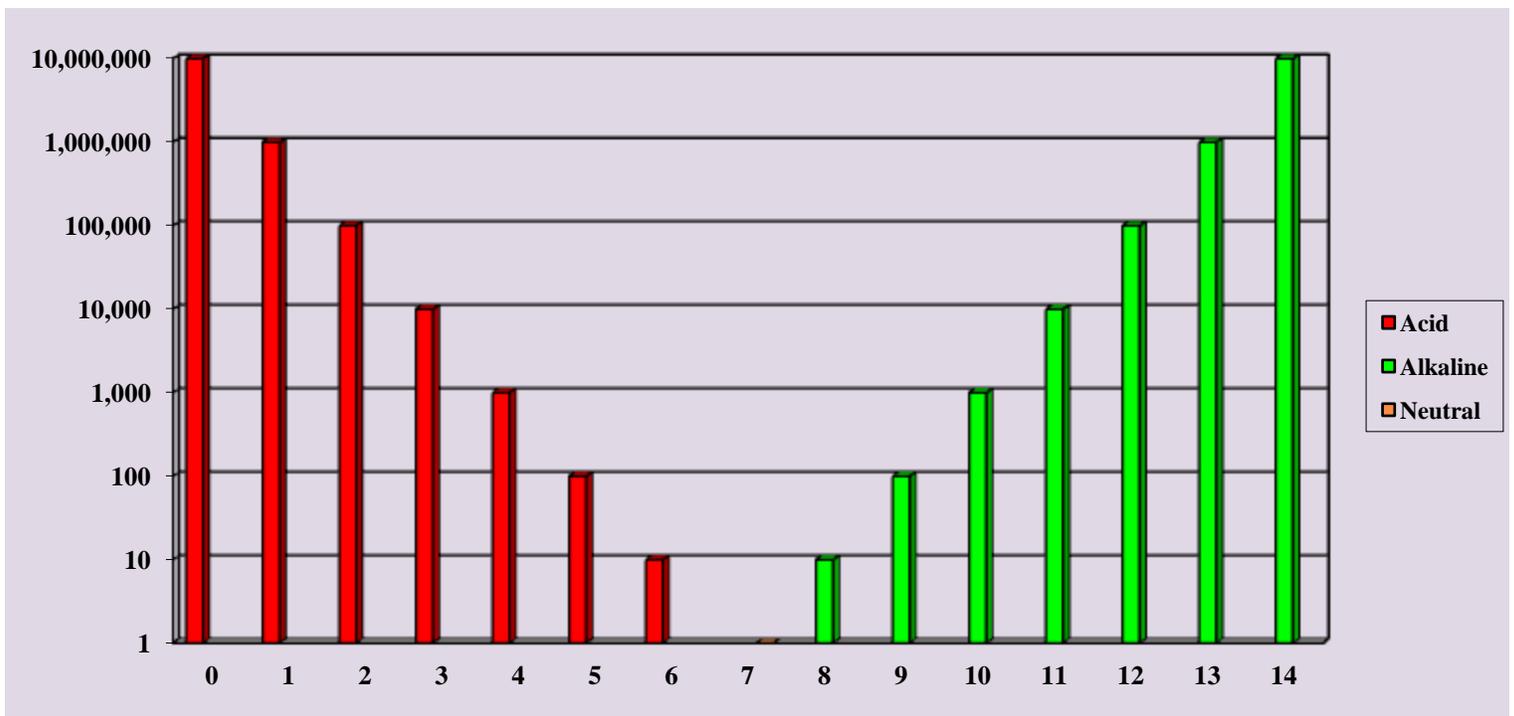
Chemistry

Many of us recoil in horror when we hear the word chemistry. It reminds us of that horrible class we took in high school. We were expected to memorize terms such as electrons, protons, valence and that terrible periodic table.

The difference between your high school chemistry class and learning cleaning chemistry is tremendous. Back then chemistry was a subject you felt you would never use. Today understanding a bit of detergent chemistry can not only make our jobs easier but also increase our profitability. But just like in school we need to learn some of the terms to really understand cleaning chemistry.

pH - the **relative acidity or alkalinity** of a water-based solution. The pH chart ranges from 0-14. Acids are below 7, neutral is 7, and everything above 7 is alkaline. Each number as it moves from 7 in either direction increases by 10 times the previous number.

In addition to pH the strength of a cleaning solution is determined by the **concentration**. This measures the amount of material in the solution. For example 7% acetic acid means of the total weight 7% is acetic acid.



Water is H₂O or it could be written as H-OH. The OH⁻ is an hydroxyl and the H⁺ is hydrogen. If there are more H⁺ ions than OH⁻ then the solution is acidic and the reverse would be alkaline.

Substance

pH

| | |
|------------------------|-------------|
| Hydrochloric acid, 10M | -1.0 |
| Lead-acid battery | 0.5 |
| Gastric acid | 1.5 – 2.0 |
| Lemon juice | 2.4 |
| Cola | 2.5 |
| Vinegar | 2.9 |
| Orange or apple juice | 3.5 |
| Tomato Juice | 4.0 |
| Beer | 4.5 |
| Acid Rain | <5.0 |
| Coffee | 5.0 |
| Tea or healthy skin | 5.5 |
| Urine | 6.0 |
| Milk | 6.5 |
| Pure Water | 7.0 |
| Healthy human saliva | 6.5 – 7.4 |
| Blood | 7.34 – 7.45 |
| Seawater | 7.7 – 8.3 |
| Hand soap | 9.0 – 10.0 |
| Household ammonia | 11.5 |
| Bleach | 12.5 |
| Household lye | 13.5 |

Compound - a substance that contains two or more elements that have been bonded together by a chemical reaction. **Soap** is a compound.

Mixture - a substance containing two or more different elements mixed together, that can be separated easily but is not subject to a chemical reaction. Dirt in your vacuum cleaner bag is a mixture.

Solubility/solvent— a solid that dissolves in a liquid is called a **solute** and is said to be **soluble**. The liquid that dissolves the solid is called a **solvent** and the resulting mixture is called a **solution**. For example, sodium chloride (salt) is soluble. It dissolves readily in water forming a colorless solution. Sand, on the other hand, is insoluble; it does not dissolve in water or solvent.

Suspension - most insoluble solids settle to the bottom of a liquid, but some split into tiny particles that spread throughout the liquid. This type of mixture is called a **suspension**. Milk is a suspension of fat particles in water.

Emulsifier— process of dispersing one liquid into another liquid with which it is **immiscible** (do not mix such as oil and water). Emulsifiers are important in cases where oily or fatty soils are encountered. The main ingredient in emulsification is the **surfactant**, with a little help from the **builders**.

Surfactant— (surface-active agent) chemical that when added to a liquid, changes the properties of that liquid at the surface. It allows penetration into the material being cleaned. It makes the water wetter. Surfactants are classified as **anionic (negative)**, **nonionic (no charge)**, **cationic (positive)**. Anionics and nonionics are good cleaners. Biocides, antistats, bactericides and disinfectants normally have **cationic** surfactants.

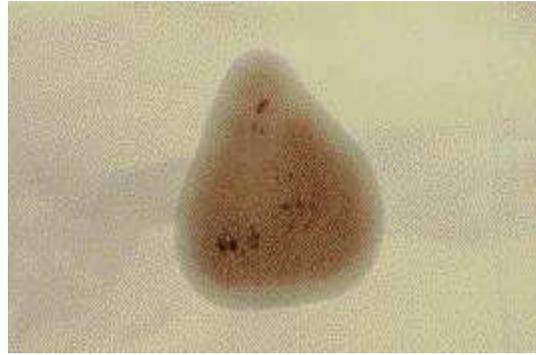
Builders— are materials that enhance or maintain the cleaning efficiency of the surfactant by tying up the hard water minerals. It also supplies additional **alkalinity** for neutralization of acid soils, aids in keeping soil from **redepositing** on the carpet and **emulsifies** oily and greasy soils.

Saponification— The process of converting fat into soap by treating it with an alkali. It comes in handy in greasy restaurants.

Buffer — is a solution which is resistant to changes in pH.

Hydrophilic – water loving, **Hydrophobic** – water hating, these are opposite ends of the detergent molecule.

Water is used in most of our cleaning products. Water is attracted to other water molecules and surrounds itself with these molecules. At the surface these molecules are surrounded only on the water side. A tension is created as the water molecules are pulled into the body of the water. This creates a surface similar to the skin on a drum.



During cleaning, this surface tension must be reduced so water can penetrate the carpet. Chemicals that do this are called surfactants because they lower or break the surface tension and allow the cleaning solution to penetrate and begin cleaning.

Soaps have been around since ancient times. Soaps are made from fats and oils, or their fatty acids, by treating them with a strong alkali. The pioneers made soap by boiling animal fats with lye. Many rug-cleaning products were made with coconut oils because of their good foaming qualities.

Unfortunately these shampoos also left a sticky residue behind which caused rapid resoiling. Soaps did not work well in hard water and formed a curd similar to the ring that develops in the bathtub.

Today we use synthetic detergents. Petrochemicals have replaced animal fats in detergents. These products do not break down in hard water like the soaps and do not leave a soil-attracting residue.

A properly formulated detergent has several ingredients:

Surfactants- helps to penetrate, lower the surface tension and wet out the fabric. Anionic (-) cationic (+) nonionic (o)

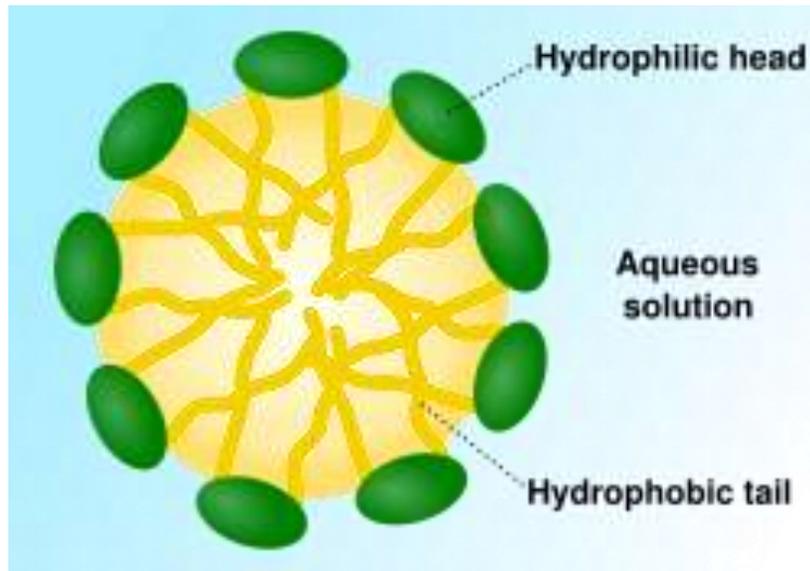
Builders- help to provide alkalinity and soften the water and prevent redeposition of the soil once it has been suspended. Soft water uses less detergent.

Solvents – designed to emulsify oils.

Deodorizer– because if it smells clean it is clean

Soap and detergent molecules do have one thing in common. One end of the molecule hates water (**hydrophobic**) and one end likes water (**hydrophilic**).

Think of a detergent molecule as resembling a **tootsie roll pop**. The head (the tasty part) is the water loving part and the tail or stick is the water hating part. If it is water hating that means it will go to anything that isn't water such as oils in the soil. The stick/tail attaches to the oily soil while the head is attracted to the water of the cleaning solution. Eventually the head pulls into the water and the tail pulls the dirt off the fiber into solution. This is normally happening during the preconditioning or soil suspension step. Agitation during this step speeds up the process and a hot solution will help to dissolve grease and oil on the carpet.



Chemicals required for cleaning:

1. Preconditioners – the workhorse of cleaning. Because most soil is acid most preconditioners and detergents are alkaline. Soil suspension is accomplished primarily with this step. These products can fall into several categories.

- General - can be safely used on all synthetic fibers as long as the product has a pH under 10 and is not cationic.
- Heavy duty – used on restaurants and non stain resistant carpets. Normally the pH is 10-12 and may include enzymes. Voids the warranty on stain resistant carpet.

- Neutral to acidic – mild products used on wool, cotton and any non-colorfast carpets or rugs

2. Rinse detergents – added into cleaning solution.

- Alkaline – used on any synthetic including stain resistant carpet as long as the product has a pH under 10 and is not cationic.
 - Used when carpet is more than moderately soiled.
 - Can be used on wool if pH is 8.5 or below.
 - Can accelerate browning on cellulosic materials.
 - Most preconditioners are alkaline due to acidic soil.
- Acid – used in place of an alkaline detergent when carpet is light to moderately soiled.
 - Very effective in removing alkaline residue from previous cleanings.
 - Stabilizes dyes while preventing browning.
 - Breaks down alkaline salts from old urine.
 - Usually dries faster than alkaline detergents.
 - pH 2-5

In most residential carpets a quality preconditioner and rinse detergent will remove 90-95 of soil and spots.

Remember that most of your cleaning is being accomplished with two products, a preconditioner and detergent. This is not the time to look for the least expensive chemicals. Labor is the most expensive component of your business. If you use cheaper chemicals your labor expense will increase. Effective chemicals make the job easier and will result in happier customers. That means repeat business.

Chemical dilutions

1 gallon = 128 oz.

1 quart = 32 oz.

1 pint = 16 oz.

1 cup = 8 oz.

1:4 means 1 part chemical to 4 parts water. $128/4 = 32$ oz. chemical to 1 gallon water.

Always dissolve powders in hot water and stir thoroughly.

Review #6
Chemistry

1. *The pH chart ranges from ___ to ___ with ___ being _____.*
2. *Any water-based solution below 7 is _____ above 7 is _____.*
3. *A surfactant allows _____ into the fabric being cleaned.*
4. *A builder adds _____ and _____ water while _____ oily and greasy soils.*
5. *Hydrophilic loves _____ hydrophobic _____ water.*
6. *A surfactant resembles the candy _____.*
7. *Soaps do not work as well as detergents in _____ water.*
8. *The universal solvent that dissolves the most substances is _____.*
9. *The pH of toothpaste is on the _____ side of the pH scale.*
10. *The pH of a browning removal product is on the _____ side.*
11. *Rust is considered _____ so to remove use an _____ product.*
12. *Most disinfectants contain _____ surfactants.*
13. *Mixing a _____ surfactant with an _____ surfactant will make a gooey mess.*
14. *Doubling the amount of detergent will most likely leave additional _____ in the carpet making it feel _____.*
15. *Adding a scented deodorizer leaves a pleasant _____ but does not neutralize the odor. It dissipates as it dries.*

Spotting for the professional

Once the carpet has been preconditioned and rinsed a few spots may remain. In many cases while 95% of the carpet may look great it may be these few spots that really provoked the customer to call. If you cannot remove these spots the customer may feel that you failed.

The difference between a cleaner and a professional is getting those spots out of the carpet. A word of caution, a few stains may not be removed. Learn how to resection a carpet and you can guarantee 100% spot removal.

Definitions:

- Spot – substance added
 - Gum, tar, food, ink
- Stain – color added
 - Wine, red pop, mustard
- Discolorations – color removed
 - Bleach, medicine,
- Damage – repair required
 - Toilet bowl cleaner, burns



Identification: before you can remove a spot you need to identify the category that it falls in. Knowing the fiber and backing type you are working on will help determine how aggressive you can get. In other words there is a big difference in taking red dyes out of wool versus olefin. Solvents are much riskier on glue down installations than on stretch in installations.

- ❖ Ask the customer
- ❖ Location – bathroom versus kitchen
- ❖ Use your senses
 - Sight
 - Smell
 - Touch
 - Taste?

This is not a professional spotting kit



Professional Spotting Kit

Using a professional spotting kit will instill confidence in the consumer that they chose the right company. The spotting kit should have

a solid bottom and a lid that can close. Ideally it will have preformed slots so that a missing bottle is very evident before you leave the job site.

Chemicals required:

Solvents – normally water free and used to break up oily or non-water-soluble spots (nonpolar). When using solvents wear PPE and provide plenty of **ventilation**. Solvents normally have a low **flash point** (temperature at which a vapor will ignite). Solvents should be used carefully to prevent delamination of the carpet backing.

- **VDS** - Volatile Dry Solvent (evaporates) solvents are only used for spotting, not total cleaning. **Volatile means evaporates.**
- **NVDS/POG** - Nonvolatile Dry Solvent –also referred to as Paint Oil Grease remover – leaves a residue that needs to be rinsed. Provides more dwell time than a volatile solvent.
- **Citrus gels** - same as POG except in a gel form which helps to prevent delamination of carpet or adhesive. **Must be flushed.**

Water-based – these spotters are used on water-soluble (polar) spots. Many of these spots are easily removed with a quality preconditioner and extraction.

- **NDS** Neutral Detergent Spotter pH 6-8
- **ADS** Alkaline Detergent Spotter pH 9-10
- **AS** Acid/tannin spotter pH 4-6 (**tannin is a vegetable dye found in tea and coffee.**)
- **Enzyme/digester** pH 7 – designed to break down protein and carbohydrate materials that have become insoluble. Must be used with hot water 100-150° and at least 20-30 minute dwell time. Some spots may require even longer dwell time. The spot should be rinsed prior to application of the enzyme to provide a neutral environment. Rinse as the final step.
- **Rust remover** pH 1-4 – neutralize and rinse after applying rust remover.
- **Dye remover** – can also remove carpet dye.

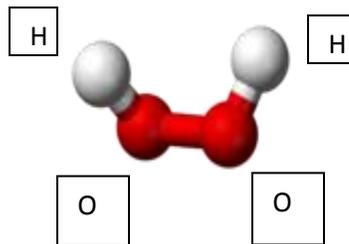
Oxidizers/Reducers- color removal by adding oxygen

Oxidizers are bleaching agents. Before you think that you are going to damage all your carpet, you need to understand the different types of bleaches. The sun is the biggest oxidizing agent. Ozone used in odor remediation



is an oxidizer. A few are great tools and others will get us in trouble.

- Sodium hypochlorite/ household bleach will dissolve wool and silk and destroy the color in nylon. While it can be safely used on 100% olefin it should only be considered in a salvage situation
- Sodium perborate/percarbonate is a common ingredient in many boosters or energizers used in our industry.
- 3% Hydrogen peroxide is a very safe yet slow acting color remover. Effective on minor blood spots. It is always found in a dark bottle and should be kept in a cool dark place. Hydrogen peroxide is self-neutralizing. Higher % hydrogen peroxide used for hair bleaching may also bleach the carpet.
- Oxidizers can be accelerated by heat and light.
- A color made invisible by oxidizers is permanent.



Reducers/strippers perform a similar function (**color removal**) to oxidizers by **removing** oxygen from the stain.

- Reducers are not as permanent as oxidizers because the stain may absorb oxygen-containing moisture.
- Reducers are commonly found in coffee stain and browning formulas as well as in Haitian cotton cleaners.
- Sodium Bisulfite or metabisulfite are mild reducers.
- Sodium Hydrosulfite is much stronger with a terrible sulfur smell. Suppliers have new formulated products that are effective on mustard and furniture stains.



Enzymes – are protein molecules that accelerate chemical reactions by helping to break up other target molecules such as blood, eggs, milk and old urine into smaller soluble pieces. Most cleaning or spotting enzymes are proteolytic which means they break down protein.

Enzymes are not living organisms but biological catalysts and are highly specific. They work similar to a key and lock.

Microorganism deodorizers are made up of specific strains of bacteria or fungi, which are considered living, as compared to enzymes which are nonliving.

Enzymes are easily deactivated by extremes of pH, temperature, cationic surfactants and require water at all times.



Spotting tools required:



pH paper



bone spatula



Tamping brush



napping shears



Trigger sprayer



Drip spout for spotting bottle



Inspection light



UV light



Gloves



Goggles



Respirator

Steps of removal – remember that you did not cause the spot or stain. Explain to the customer the options and the risks of each method. You do not determine which method to use. The customer selects after you have provided the information. If necessary have the customer sign a release. If the stain cannot be removed it is because of the characteristics of the staining material in relation to the fabric. It is not the weakness of the technician.

1. **Always pretest your chemicals.**
2. **Wear appropriate PPE.**
3. **Follow the label directions.**

- Remove the excess – blot, scrape, absorb.
- Check the solubility of the spot. When in doubt of the stains components use a volatile (**evaporates quickly**) solvent on a towel and blot. If it is solvent soluble it will transfer. If not it evaporates quickly and you can switch to a water-based spotter.
- If the spot responds to your choice of spotter be sure to work on the spot from the outside in to avoid spreading the spot.
- Patience! If you use the correct spotter most spots will dissolve given adequate dwell time.
- Once the spot has been suspended rinse thoroughly.
- If the carpet has a pile, groom the pile.
- **If you believe the spot may wick, place absorbent paper toweling on the spot and weight it down. Inform the customer to remove the toweling in 12 –24 hours.**

Concerns:

- Using more of a spotter can leave more residue and cause resoiling. **More is not better.** Additional dwell time, heat or agitation will work more efficiently.
- Never **rub** a spot. Use the tamping brush or a bone spatula. Wrapping a towel around the brush helps keep your brush clean and absorbs the spot.
- If the spot is **lighter than the carpet** you probably have color loss and the carpet needs to be redyed or resectioned.
- Urine spots and odor are difficult because the customer believes there is only 1 spot while there may be multiple locations. Once the residue has been removed there may be a color loss from
- old urine. The customer needs to be informed before spotting is attempted.

Specialty spotting – certain spots may require specialty spotters and techniques. Use caution and explain everything including risks to the customer prior to attempting spotting.

Rust

Hydrofluoric acid has been the most effective rust remover for years. Unfortunately it is the most dangerous. It desensitizes the nerve ending and can cause serious burning. When using any acidic rust remover such as hydrofluoric, oxalic, phosphoric or a specially formulated acid neutralize with an alkaline material and thoroughly rinse the spot. If the spot should turn a different color such as pink or purple use an alkaline spotter or ammonia and the spot should return to the normal color. This is referred to as an indicator dye stain and means the normal pH of the fabric has been affected. Hydrofluoric acid can etch glass. Watch where you set the bottle.

Red dye

Specialized spotters have been developed for red and other synthetic dye removal. Most use the heat transfer method. Apply the dye remover to the spot then place a damp towel and place the iron or wallpaper steamer over the spot. Check the towel after 15-30 seconds to see if there is a transfer. As long as the dye of the carpet is not transferring to the towel it is safe to continue.

Pictures courtesy of Referral Cleaners



Mustard-

Removing organic dyes such as mustard and furniture stain requires an oxidizing agent. Mustard and furniture stains are difficult to remove. For severe stains the chemical may need to be covered in plastic and allowed to dwell for 8-24 hours.



Persistent protein (milk, gravy, egg)

Remove excess material and rinse. Work **enzyme digester** into spot. Cover with a hot wet towel. Place bucket of hot water on spot and wait 20-30 minutes. Remove observe and rinse. **Important** do not use hot water on protein spots.

Blood

Small amounts may be removed by a cool spotter or an enzyme/digester. For larger amounts follow blood-borne pathogen guidelines.



Benzoyl Peroxide

Is a bleaching agent (peroxide) present in acne medicine and other cosmetics or medications. It is activated by heat and moisture. Causes loss of color and must be redyed or resectioned.



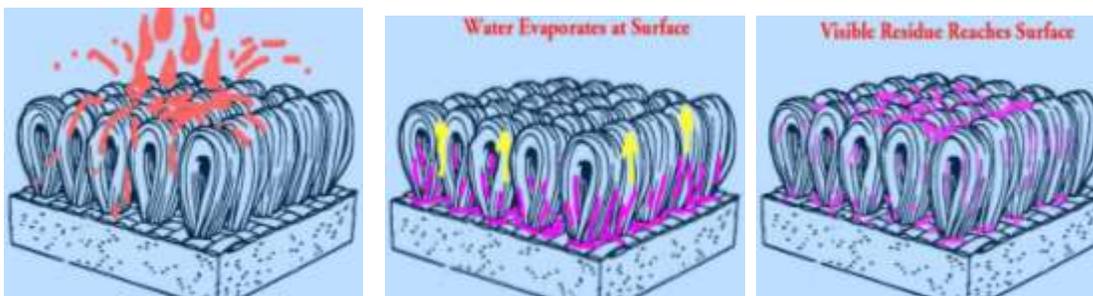
Gum

Your favorite gel product agitation and dwell time, rinse/extract. This is when a hot portable or truck mount is very handy.

Why do spots return?

1. Didn't remove all the residue
2. Didn't remove all the detergent residue
3. It is a new spot

Wicking is your enemy. You must remove the source



Wicking is the upward migration of moisture in a fabric

Spotting Chart

| | | |
|---|--|---|
| <p>Volatile Dry Solvent VDS</p> <p>Ink Fresh paint Grease Carbon Shoe polish Tar Oil Rinse for NVDS <u>VDS is for minor solvent soluble spots if spot is heavy go to NVDS.</u></p> | <p>Non Volatile NVDS POG</p> <p>Nail polish Lipstick Glue Dried paint</p> <p><u>NVDS should be rinsed with VDS. Be careful of delamination.</u></p> | <p>Citrus Gel</p> <p>Gum Lipstick Glue Can be used in place of NVDS when delamination is possible.</p> <p><u>Gels must be rinsed. Gelling agent can cause rapid resoiling.</u></p> |
| <p>Neutral Detergent NDS</p> <p>Minor water soluble spots</p> <p><u>Preconditioner will remove same spots during cleaning.</u></p> | <p>Alkaline Detergent ADS</p> <p>Food Soft drinks Rust remover neutralizer</p> <p><u>Preconditioner will remove same spots during cleaning.</u></p> | <p>Acid/Tannin Spotter AS</p> <p>Tea Coffee Urine Feces Alkaline Neutralizer</p> |
| <p>Enzyme/Protein Spotter</p> <p>Old food Blood Old milk Old urine Gravy Vomit</p> <p><u>Apply cool and allow plenty of dwell time.</u></p> | <p>Rust Remover</p> <p>Rust</p> <p><u>Be sure to neutralize and rinse. Can cause burns and etch glass.</u></p> | <p>Oxidizer/Reducer</p> <p>Dye stains Wine Furniture Stain Mustard</p> <p><u>These products can also remove carpet color. Use caution.</u></p> |

**Remember to pretest your spotters and follow directions.
Experiment at home not in your customer's home.
Use only enough spotting solution to suspend the spot.
Mixing chlorine bleach with ammonia forms toxic chlorine gas.
Isopropyl alcohol is handy for dye crocking, cough medicines,
Christmas tree pads, and window cleaner (Windex).**

Additional chemicals

Deodorizers – odors are triggers. Smells may be experienced as negative, positive or neutral. If we react negatively to an odor we are provoked to a behavior that reduces or removes the odor. A favorable scent leads us to a positive or pleasant reaction. In our industry we have a variety of deodorizers.



- **Scents** are products that only add a perfume to the air and have no other quality other than masking. This will not destroy a bad odor. Once the scent has evaporated the malodor will return.
- **Odor neutralizers** contain essential oils that attract malodorous molecules and neutralize them.
- **Microorganisms** are natural fungi or bacteria used to destroy urine-based odors.
- **Biocides/sanitizers/disinfectants** kill specific bacteria or sanitizes to a level of public acceptance.
- **Oxidizers** such as ozone, chlorine bleach, or hydrogen peroxide burn up odors.

Principles of Deodorization

Regardless of the cause of the odor the following principles must be followed or the smell will return.

1. **Eliminate the source.**
2. **Clean all surfaces.**
3. **Recreate the conditions of penetration.**
4. **Seal materials that cannot be thoroughly treated or removed.**

Tools for odor detection



Moisture Sensor



UV Light



Sub Surface Extractor



Fogging

Defoamers – products designed to eliminate foaming problems in hoses and extractors. It is available in powder or liquid form. Due to silicone formula defoamers are not designed to be applied directly to carpet. **This will cause resoiling and voids stain resist warranties.** Add defoamer directly to vacuum hose at the hose cuff nearest the wand.

If using a portable extractor add it to the recovery tank also.



Antistats – most nylon fibers have a built in carbon core fiber that reduces or dissipates the static charge.

- Static problems usually occur in times of low humidity, normally winter.
- Antistat products are available to spray on a clean carpet to dissipate the static charge.
- Most antistats are silicone-based and void warranties of stain resist nylons.



Soil & Stain protectors

- **Soil retardants** – filled in crevices of the fibers with Colorless particles to prevent soil from attaching. Carpets became stiff.
- **Silicones** – great water repellency but not very effective on oil or dry soil. Starting in 1986 **voided stain-resist warranties**. Many silicones cause rapid resoiling.
- **Fluorochemical** – the 2 most recognized trade names are 3M Scotchgard and Dupont Advanced Teflon. They improve stain and soil resistance by **lowering the surface energy** of the fabric and creating a barrier.
 - **Solvent** – better oil and water repellency.
 - **Water** – better dry soil repellency and durability.
- **Factors effecting its performance**
 - Concentration of chemical applied.
 - Surface of the material, the flatter the better.
 - Grooming the carpet helps the penetration.
 - Fabric should be residue free.



Your sales will increase drastically if you will do 2 things:

Ask every customer!



Demonstrate the performance



Review #7
Chemicals & Spotting

1. *The workhorse of cleaning products is the _____.*
2. *A(n) _____ detergent is used on soiled synthetic fabrics.*
3. *A(n) _____ is the best choice for neutralizing a preconditioner.*
4. *For all synthetic carpet the safest pH to use is under _____.*
5. *A _____ repels all three types of soils.*
6. *A gallon contains _____ ounces.*
7. *A spot adds _____ to the carpet, a stain adds _____.*
8. *Asking the customer, noting the _____, and using your _____ helps to identify the spot.*
9. *A(n) _____ adds oxygen to a spot a reducer _____ oxygen.*
10. *Use solvents that have a high _____ and be sure to _____ the area.*
11. *To remove a coffee spot use a _____ spotter.*
12. *When using rust removers _____ and _____.*
13. *Acne medicines contain _____ which can bleach fabric.*
14. *_____ spotters need heat, _____ and longer dwell time.*
15. *Nail polish, lipstick or paint will need a _____ to remove.*

Carpet Cleaning Procedures in the Home

Before we can talk about procedures we need to look at your image. Do you realize that before you opened your mouth, the customer has already determined if she likes you? According to Malcolm Gladwell, in his book *Blink* he refers to this as our adaptive unconscious. This part of our brain is similar to a giant computer that quickly and quietly processes a lot of data, your van, your uniform, your body language and decides if she will let you in. This is “thin slicing” which refers to the ability of our unconscious to find patterns in situations and behavior based on very narrow slices of experience. You are being compared to every other service person she has dealt with. So in other words you don’t want to look like **Bozo Clean**.

Bozo Clean



So wear a clean uniform, work on your grooming, wear an ID badge and make sure you are smiling and looking at the customer when she answers the door.

Now that you are an expert in the fields of fiber, carpet, chemistry, principles of cleaning and spotting, it is time to put all that knowledge to good use. While having the technical expertise is critical even more important is how the technician relates and communicates to the customer. The choice of one or two technicians is up to the company. The consumer who is most likely female would prefer two technicians for a couple of reasons:

- She feels safer with two people.
- She feels her furniture will be properly moved.

Two technicians will not complete the job in half the time of one technician but they will be much faster and more efficient. Two technicians usually are more cost effective for the company. The second technician can also be clean upholstery or other material in the home while the first tech cleans carpet. This also allows for training of a second technician.

Park that clean van where the customer can see it and immediately head for the front door.

Greeting the customer

- ✓ Knock on the door and step back from the door.
- ✓ When the customer answers, smile and hand her your business card.
- ✓ After the customer has invited you in place a mat and wipe your feet.
- ✓ Look at your clipboard and ask the customer to show you the areas to be cleaned. A good **preinspection and communication** of your findings will prevent complaints and instill confidence in the customer.
- ✓ As the customer gives you a tour write down any and all comments on your invoice. Ask the customer pertinent questions.
 - How old is the carpet
 - Any spots or areas of concern
 - Any pets
 - Bad seams, ripples, loose carpet
 - Previous cleanings
 - Any health concerns of occupants
- ✓ Perform a burn test and colorfastness test if needed.



- ✓ Review the areas of concern with the customer and explain what you will do to take care of these areas. Do not over promise. Set realistic expectations for the customer. Clean a “magic square.”
- ✓ Start in the **furthest area** of the home unless the customer requests otherwise.

Cleaning – follow the principles of cleaning.

- ✓ Prevacuum edges and entryways. Give extra attention to traffic areas.
- ✓ Move furniture away from walls and clean perimeters first. Remember to **tab and block all furniture** to prevent staining. Once perimeter is cleaned the open areas of the room can be cleaned. Move furniture back to exact location where you found it.
- ✓ Precondition and agitate.
- ✓ Perform extraction. Overwetting is normally caused by technician error. Not enough extraction passes, improper technique or faulty equipment can cause this.
- ✓ Apply post treatment chemicals. Protectors are always applied last. Be sure to wipe up any overspray.
- ✓ Groom carpet. This helps the carpet to dry, and improves the overall appearance. Grooming also helps to spread and allow penetration of post treatments.
- ✓ Dry carpet. Use airmovers. Turn on ceiling fans with customer’s approval. Check ceiling fans for soil accumulation before activating. Best drying temperature is between 70-72°. Carpet should dry within 6-8 hours.

Customer consultation

- ✓ Review the job with the customer. Make sure everything has been done to her satisfaction. If she has any concerns, even if you think you have done everything possible, try it one more time. Make one final trip through the home to make sure you didn’t leave anything behind.
- ✓ Ask for the check number.
- ✓ Give her tips on maintaining her carpet. Explain the drying process and why it is best for people and pets to stay off the carpet till it is dry. Provide her with traffic lane paper or booties. Emphasize the importance of frequent vacuuming. It is a good idea to inspect her vacuum and point out any concerns e.g. belts, bags, and brushes.
- ✓ Thank the customer for her business and leave business cards for her friends and neighbors.

Leaving the job

- ✓ Be sure to walk around your van and close all the doors. Check for kids, bikes, and the family dog etc.
- ✓ Pick up any balls of fuzz in the driveway that came from your vacuum hose.
- ✓ Back out carefully.

Post job

- ✓ Dump waste in a manner approved by local, state and federal guidelines. The wastewater must go to a wastewater treatment facility.
- ✓ Clean and refill sprayers and containers.
- ✓ Wash the van.
- ✓ Organize the van for the following day.



Dumping wastewater is illegal and very expensive if you are caught.

**Review #8
Procedures**

1. *A thorough _____ and _____ with the customer will prevent many problems.*
2. *Wear a clean _____ with an _____ badge and _____.*
3. *Ask about any _____ before you leave the door open.*
4. *Introduce the other tech as your _____ even if he is a helper.*
5. *Start in the _____ area of the house with the customer's permission.*
6. *Even if the customer has _____ you still need to vacuum.*
7. *Remember to under _____ and over _____.*
8. *Clean the _____ _____ in the most soiled area.*
9. *Follow up the preconditioner with _____ in the traffic areas.*
10. *Following extraction _____ all cut pile carpet.*
11. *Be sure to wipe up all hard surface areas to avoid _____ and _____ hazards.*
12. *Tab and _____ all furniture that has been moved.*
13. *Use _____ _____ to speed the drying process.*
14. *Recommend how to keep her carpet looking good by frequent _____ and proper _____ of spots.*
15. *Dump _____ in an approved receptacle.*

Problems & Solutions – a chance to show your skills

Browning

- Browning is caused by, **overwetting, slow drying** and **cellulosic** material such as cotton and jute. It is accelerated by alkalinity. The culprit causing the problem is **lignin**, a naturally occurring gum. In the presence of moisture it breaks down and is transported to the surface. Most of the backings that are used today on tufted carpets are synthetic. The only way to have true cellulosic browning is to have cellulosic materials involved. On the rare occasion that you would encounter browning on a synthetic carpet it is much **easier** to remove. Normally because browning is caused by alkalinity it is cured by an acidic application. In the old days this was called souring. Today we use formulated browning formulas, acid rinses, mild reducers or hydrogen peroxide. Whichever product is chosen it should be lightly misted or applied to the tips only of the carpet.

Wicking

- A common misconception is that wicking is browning. Wicking is the **upward migration of moisture in a fabric**. The best analogy is that of a kerosene lantern. The oil wicks the bottom to the top of the wick and is lit. This process is referred to as capillary action. The difference between wicking and cellulosic browning is the absence of cellulose in synthetic carpet. The discoloration found on the tips of synthetic carpets especially on olefin Berber's is soil. Due to the **lack of dry soil removal** prior to wet extraction soil wicking is a major problem today. Overwetting and slow drying increase the chances of wicking.

Wicking occurs in spotting situations when the residue of the contaminant or the spotter wicks to the surface during drying. If you suspect this may happen, the final step after rinsing is to apply a poultice of absorbent material such as paper towels to the top of the spot. Place a weight on top of ½ inch of paper towels and allow it to dry. The moisture and residue will continue to wick into the towels.

Yellowing - comes in many forms.

- **BHT** (butylated hydroxy toluene) is an antioxidant that has been used primarily in carpet cushion. It was believed to have been the cause of yellowing on carpet and its use has been discontinued in

the manufacturing of cushion. To remove dilute citric acid and spray and agitate on the tips of the carpet. Citric acid may dry to a harsh crystal and should be vacuumed and rinsed with an acid rinse.

- **Pesticides** – applied to the perimeter of the carpet may attack a primary color and cause a color change. This damage is permanent.
- **Optical brighteners** – reflect the blue-white part of light. Use of OB's on carpet may cause a permanent yellowing.
- **Nitrogen Dioxide** – loss of the blue or red dye from incomplete combustion may cause permanent yellowing.
- **Ozone** – attacks the blue dye and may leave a permanent yellowing.
- **Soiling** – soil can cause yellowing especially on blue or gray carpet. Cleaning using maximum soil suspension can remove yellowing.
- **Tracked in oils** from parking lots, warehouses etc.
Maximize soil suspension.

Soil Filtration (associated with air pollution)

- The name aptly describes the problem. The microscopic particles of soil that continuously float in the air are filtered by the fibers usually along the perimeters of the room and under closed doors. Much of this soil is carbon and other non-soluble forms of soil with an oily residue that only complicates the removal. Removal will once again use the principles in an aggressive manner. Staining may be permanent.
 - Thorough vacuuming by hand.
 - Specially designed chemical or aggressive preconditioner heated if possible.
 - Hand agitation or tamping brush.
 - Hottest rinse extraction possible.
 - Groom & dry.

Fume fading

- Loss of color in carpet due to atmospheric pollutants such as ozone and NO₂ passing through fibers. May not be apparent until soil filtration is removed.
 - Permanent damage

Streaking

- Clean or dirty streaks in carpet caused by:
 - Improper wand stroking
 - Blockage of vacuum slot or Tee jets
 - Wicking
 - Improper preconditioning (clogged sprayer tip)

Ready to go?

Van ready



How about your equipment?



How about your tools?



Finally are you ready?



Jon Don Carpet Cleaning Quiz

1. Wool fibers should be cleaned with a pH range of:
 - (A) not affected by pH
 - (B) 4.5-8.5
 - (C) neutral only 7.0
 - (D) dry clean only solvents
2. Which of the following carpet fibers is the most absorbent and requires longer dry time:
 - (A) nylon
 - (B) olefin
 - (C) wool
 - (D) polyester
3. Cellulosic fibers are derived from:
 - (A) petrochemicals
 - (B) plants
 - (C) animals
 - (D) minerals
4. Which of the following fibers are protein:
 - (A) nylon, olefin
 - (B) wool, silk
 - (C) polyester, acrylic
 - (D) cotton, jute
5. A wool fiber may be used in a commercial building for what reason:
 - (A) low flammability
 - (B) owner of the building used to be a shepherd
 - (C) wool is not affected by aggressive cleaning
 - (D) wool is inexpensive
6. Which chemical will dissolve wool:
 - (A) chlorine bleach
 - (B) formic acid
 - (C) 3% Hydrogen peroxide
 - (D) sodium chloride

7. The most popular synthetic carpet fiber is:
 - (A) nylon
 - (B) olefin
 - (C) acrylic
 - (D) polyester

8. Nylon is most affected by what type of stains:
 - (A) oily
 - (B) dry soil
 - (C) acid dyes
 - (D) cosmetics

9. Fourth generation fibers contain what additive to improve soil and stain resistance:
 - (A) fluorochemical
 - (B) solvent
 - (C) sodium hypochlorite
 - (D) acetic acid

10. Which fiber is most stain resistant:
 - (A) nylon
 - (B) wool
 - (C) olefin
 - (D) acrylic

11. Fifth generation carpets repel what type of stains:
 - (A) urine
 - (B) acid dye
 - (C) disperse
 - (D) water damage

12. Synthetic fibers including stain resist fifth generation fibers can be safely cleaned using a pH:
 - (A) must use a neutral pH
 - (B) must use an acid pH
 - (C) below 10
 - (D) above 10

13. Olefin fibers, even in a Berber (loop) construction:
 - (A) crush easily
 - (B) repel oily stains
 - (C) are ideal in high traffic areas
 - (D) are damaged by acid dye stains (Kool-Aid)

14. The fiber that melts easily from dragging furniture or due to hot couplers resting on the carpet is:
- (A) polyester
 - (B) wool
 - (C) nylon
 - (D) olefin
15. Polyester fibers are best used in:
- (A) Rikko the Rhino's house
 - (B) low traffic areas e.g. bedrooms
 - (C) high traffic areas e.g. school classrooms
 - (D) carpet for stairways
16. Triexta is a:
- (A) fiber used to make pants that squeak when your legs rub
 - (B) new fiber that repels acid dyes and has good resilience
 - (C) fiber that will never wear out
 - (D) new car from BMW
17. When doing a burn test to identify a fiber, if the residue turns to an ash you have:
- (A) really messed up
 - (B) a natural fiber
 - (C) a synthetic fiber
 - (D) a burnt finger
18. Which fiber floats on water:
- (A) olefin
 - (B) nylon
 - (C) wool
 - (D) cotton
19. Stain resist nylon (StainMaster) is warranted against common household food and beverage in :
- (A) all structures
 - (B) owner-occupied residences
 - (C) apartments
 - (D) offices

20. When cleaning a carpet made of staple fibers the cleaner or consumer may encounter loose fibers. This is normal and is called:
- (A) shedding
 - (B) big trouble
 - (C) pin drafting
 - (D) staplitis
21. Primary colors consist of:
- (A) change when you enter secondary school
 - (B) red, blue, yellow
 - (C) blue, green, red
 - (D) black, white, magenta
22. When pigments are added to liquid polymer before extrusion the dye method is called:
- (A) beck
 - (B) solution
 - (C) hit and miss
 - (D) print
23. Carpets that have been print dyed are found primarily in:
- (A) hospitality & restaurants
 - (B) family rooms
 - (C) schools
 - (D) mobile homes
24. Bleeding is normally caused by:
- (A) high alkalinity and slow drying
 - (B) solvent chemicals
 - (C) absorbent compounds
 - (D) tripping over your hoses
25. Optical brighteners reflect the blue white light causing colors to be brighter but:
- (A) void carpet warranties
 - (B) only work on cotton
 - (C) only work in nightclubs
 - (D) are a figment of our imagination

26. Pooling, watermarking and shading:
- (A) can be repaired
 - (B) are only found in rugs
 - (C) is an apparent color change when the pile is bent and the light reflects differently
 - (D) only affects natural fibers
27. When the primary and secondary backings separate it is called:
- (A) dimensional stability
 - (B) delamination
 - (C) shrinkage
 - (D) divorce
28. Backings made of a synthetic material cannot:
- (A) be used in woven goods
 - (B) shrink
 - (C) delaminate
 - (D) deflocculate
29. Woven carpets made with a natural yarn backing such as cotton or jute:
- (A) are only made in the U.K.
 - (B) can shrink
 - (C) are found only in rugs
 - (D) only found in mansions
30. Carpet styles Saxony, frieze, and plush are examples of:
- (A) cut pile
 - (B) loops
 - (C) textured loops
 - (D) Berbers
31. An olefin Berber carpet may be difficult to clean due to:
- (A) the cleaning head bouncing on the carpet and losing vacuum
 - (B) olefin being so resilient
 - (C) you left your wand at the last job
 - (D) solution-dyed fibers holding soil

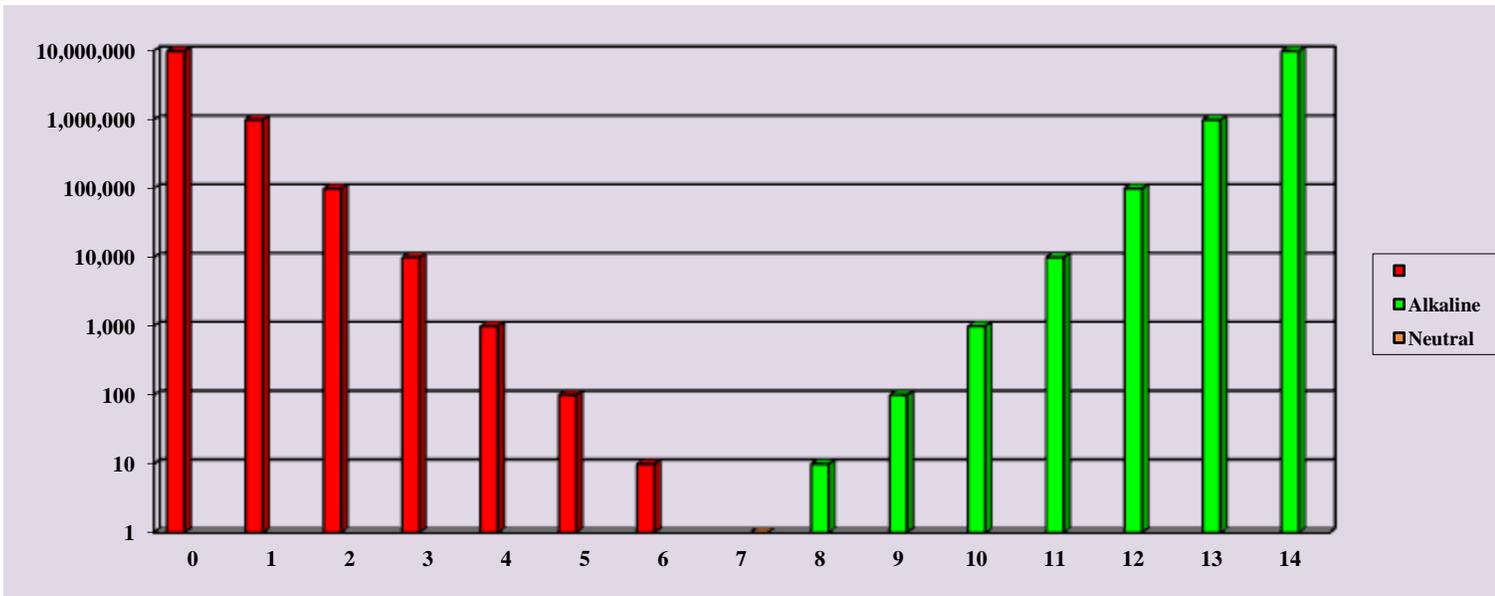
32. The difference between real soil and apparent soil is:
- (A) spelling
 - (B) you can charge more for real soil
 - (C) apparent soil comes from animals
 - (D) apparent soil cannot be removed and shows up as graying of the traffic lanes
33. The proper tool used by a professional installer to install stretch in carpet is a:
- (A) knee kicker
 - (B) power stretcher
 - (C) his helper
 - (D) staple gun
34. When vacuuming the technician should:
- (A) slow down on the pull pass
 - (B) wear his special vacuuming outfit
 - (C) use the truck mount
 - (D) use the customers vacuum
35. Dry insoluble soil including sand, hair, skin and dust accounts for:
- (A) 74-79% of total soil
 - (B) 50% of total soil
 - (C) 30% of total soil
 - (D) 10% of the total soil
36. Dry insoluble soil is best removed by a:
- (A) truck mount
 - (B) vacuum cleaner
 - (C) shampooing
 - (D) opening the windows
37. Soil suspension includes TACT which stands for:
- (A) techniques used when telling the customer her house smells like a zoo
 - (B) tannin, acid, chemical, time
 - (C) time, agitation, chemical, temperature
 - (D) petroleum

38. Grooming a cut pile carpet removes wand marks and:
- (A) is usually unnecessary
 - (B) improves drying, and provides uniform distribution of protectors
 - (C) makes the carpet smell better
 - (D) hides the spots you missed
39. Slow drying time of a synthetic carpet could lead to:
- (A) shrinkage
 - (B) cellulosic browning
 - (C) odor, resoiling, slip and fall hazards
 - (D) better soil suspension
40. Place the principles of cleaning in the proper sequence by numbering 1-5:
- (A) soil suspension
 - (B) soil extraction
 - (C) dry soil removal
 - (D) drying
 - (E) grooming
41. The best way to prevent cleaning complaints when dealing with a consumer is:
- (A) give them a cheap price
 - (B) spray a deodorizer before cleaning
 - (C) thoroughly inspect and communicate your findings
 - (D) give the dog a biscuit
42. When can you skip the dry soil removal (vacuum) step:
- (A) when the customer has prevacuumed
 - (B) when you see no signs of visible soiling
 - (C) never
 - (D) when the carpet is a dark color
43. How much dwell time should you allow the preconditioner on a synthetic carpet:
- (A) extract immediately
 - (B) minimum of 10 – 15 minutes
 - (C) spray the whole house then start cleaning
 - (D) what is a preconditioner

44. What furniture should be tabbed or blocked:
- (A) bleeders
 - (B) everything that you moved
 - (C) only pieces that are flush to the floor
 - (D) valuable pieces
45. Material Safety Data Sheets (MSDS) for each chemical:
- (A) must be on each truck and made available to anyone requesting that information
 - (B) must be posted on the main entrance during cleaning
 - (C) must be given to all occupants before cleaning
 - (D) is required only when small children are present during cleaning
46. Which chemical is always applied last:
- (A) acid rinse
 - (B) fluorochemical
 - (C) detergent
 - (D) preconditioner
47. Besides setting up air movers for fast drying, what temperature is best for drying:
- (A) 80-85
 - (B) 65-68
 - (C) 70-72
 - (D) 55-60
48. Where should the wastewater be legally dumped :
- (A) in a street sewer
 - (B) down the driveway
 - (C) in a sanitary sewer system or approved wastewater treatment plant
 - (D) anywhere after midnight
49. Which of the following is an organic stain:
- (A) Kool-Ade
 - (B) Coca Cola
 - (C) Wine
 - (D) Gatorade
50. Biocides are products that can:
- (A) brighten the carpet
 - (B) be mixed into the cleaning solution
 - (C) destroy bacteria caused odor
 - (D) be sprayed after the fluorochemical

51. The purpose of a defoamer is:
- (A) keeps the foam down in your solution tank
 - (B) breaks down the foam in your recovery tank
 - (C) prepares the carpet for a fluorochemical
 - (D) used on deplane
52. Even though it will void a stain resist warranty a defoamer is the best product to:
- (A) break down oily spots
 - (B) break down old urine
 - (C) apply on soda spots
 - (D) apply to concentrated shampoo or detergent spills
53. Static problems are most prevalent during what time of the year:
- (A) summer
 - (B) spring
 - (C) fall
 - (D) winter
54. Odor problems are most prevalent during:
- (A) warm humid periods
 - (B) cold seasons
 - (C) doesn't matter
 - (D) when company is coming
55. Products such as 3M Scotchgard and Dupont Teflon are known as:
- (A) fluorochemicals
 - (B) silicones
 - (C) antistats
 - (D) surfactants
56. The purpose of a fluorochemical (Scotchgard, Teflon) is to:
- (A) repel soil, oil and water borne stains
 - (B) deodorize
 - (C) soften the carpet
 - (D) brighten the carpet
57. Browning is caused by:
- (A) overwetting, slow drying and cellulosic material
 - (B) olefin Berbers
 - (C) acid chemicals
 - (D) solvents

58. Wicking is caused by:
- (A) kerosene
 - (B) deodorizers
 - (C) fluorochemicals
 - (D) excess residue, slow drying, dry soil not removed prior to wet cleaning
59. Yellowing (BHT) caused by rebond cushion may be removed by an application of:
- (A) sodium hypochlorite
 - (B) a strong preconditioner
 - (C) citric acid
 - (D) an alkaline detergent
60. Soil Filtration is caused by
- (A) microscopic soil particles being filtered through carpet fibers around the perimeter
 - (B) aliens
 - (C) cleaning residue
 - (D) animal urine



Place the words *alkaline*, *acid* and *neutral* where they belong on the chart
 Place the words SOIL & DETERGENT on the proper sides of the chart
 Circle the number representing the more POWERFUL pH 2 or pH 10
 Place a star above the pH that you should stay under for Stain resist nylon
 Place the letter W above the range of pH that are safe to clean wool

61. The definition of pH is:
- (A) pretty hot
 - (B) phat
 - (C) the amount of phiz in water
 - (D) the relative acidity or alkalinity in a water-based solution
62. The purpose of a surfactant (surface-active agent) is:
- (A) to allow penetration of the cleaning solution into the fabric being cleaned
 - (B) to skip the vacuuming step
 - (C) make the carpet slippery
 - (D) I have no clue
63. Match the surfactant charge to the surfactant by drawing lines to the correct one:
- | | |
|--------------|------------|
| (A) cationic | negative |
| (B) nonionic | neutral |
| (C) bionic | positive |
| (D) anionic | Lee Majors |
64. A detergent molecule has a hydrophobic tail and a hydrophilic head, what does that mean:
- (A) it has a split personality
 - (B) the head likes water and the tail hates water but likes oil or soil
 - (C) it hates large crowds
 - (D) it works best in a petroleum solvent
65. Doubling the amount of detergent in a cleaning solution:
- (A) cleans twice as fast
 - (B) cleans four times faster
 - (C) will leave more residue which may cause resoiling and stiff texture
 - (D) is fine as long as the water is above 300°
66. Solubility is important because:
- (A) your breathalyzer test may not work correctly
 - (B) it determines what the soil or spot will dissolve in
 - (C) the pH may be out of balance
 - (D) it sounds impressive to other people

67. Most preconditioners and detergents are:
- (A) neutral
 - (B) acidic
 - (C) alkaline
 - (D) petroleum solvents
68. Preconditioners designed for greasy soil found in restaurants are normally:
- (A) acid sours
 - (B) 100% solvents
 - (C) high pH and may contain enzymes
 - (D) cationic
69. When using any powdered detergents it is very important to:
- (A) remove the TIDE label
 - (B) dilute thoroughly in very hot water
 - (C) mix your SECRET formula in with it
 - (D) have it blessed by the local minister
70. Using an acid rinse after thoroughly preconditioning the carpet will:
- (A) make you enjoy Grateful Dead records
 - (B) soften the carpet, brighten the colors, neutralize the preconditioner
 - (C) do nothing
 - (D) cause rapid resoiling
71. What is the best way to identify a spot or stain:
- (A) cut out the spot and send it to Dalton, GA for analysis
 - (B) use your senses, location of the spot and ask the customer
 - (C) guess
 - (D) spray it with your magic potion and if it doesn't come out call it a stain
72. Identify the spots below by placing the letter of the appropriate spotter next to the spot:
- (A) volatile dry spotter VDS
 - (B) non volatile spotter NVDS or POG paint, oil, grease remover
 - (C) citrus gel solvent
 - (D) neutral detergent spotter NDS
 - (E) alkaline spotter ADS
 - (F) acid/tannin spotter AS
 - (G) enzyme/digester spotter
 - (H) rust remover

SPOTS – you may use more than one spotter

| | |
|-------------------|------------------|
| small grease drip | rust |
| old milk spill | ink |
| gum | old paint |
| lipstick | shoe polish |
| catsup | nail polish |
| coca cola | iced tea |
| coffee | residue from POG |

73. Using too much of a POG may cause:
- (A) delamination
 - (B) uncontrollable twitching
 - (C) purple spots
 - (D) bleach spots
74. The most important issue when using solvents is:
- (A) looking good while you remove the spot
 - (B) ventilation
 - (C) total saturation
 - (D) keeping your business from becoming insolvent
75. This chemical helps to safely remove color stains by adding oxygen:
- (A) a box cutter
 - (B) oxidizers such as 3% hydrogen peroxide
 - (C) sodium hypochlorite
 - (D) Billy's bathtub chemical formulation pH 15.5

Methods of Cleaning

Match up the methods to the descriptions

All methods require dry soil removal prior to cleaning. **76-80 Choose from Hot Water Extraction, Absorbent Compound, Absorbent Pad, Rotary Shampoo, Dry Foam.**

76. This method is the most popular method and most recommended by fiber producers and carpet manufacturers. A preconditioner is applied to the carpet, agitated and allowed to dwell for 10-15 minutes to allow adequate soil suspension. The suspended soil and detergent is extracted by a portable, walk behind or truck mounted extractor. The four components of soil suspension (time, agitation, chemical, temperature) are best utilized in this method. The technician is responsible if overwetting should occur. **This method is called** _____

77. This method uses a machine that aerates the detergent into a thick shaving cream like foam. As with the previous method a preconditioner may or may not be used first. Following the application of the foam a large cylindrical brush agitates the foam into the carpet. Excess foam and suspended soil are removed from the carpet. Used properly the method is a low moisture method.

This method is called _____

78. This method involves sprinkling an organic or synthetic compound (powder) on the carpet. A preconditioner may or may not be used prior to application of the compound.

The compound is brushed into the carpet by means of a brush or a machine and allowed to dwell on the carpet for a period of time (10-30 minutes). Once the compound has absorbed the soil it is removed by vacuuming. The benefit of this method is fast drying.

This method is called _____

79. This method is the oldest method of carpet cleaning. The machine has a holding tank for the shampoo. This shampoo is fed down onto the brush. The brush turning at approximately 175 RPM creates a foaming detergent. The brush provides plenty of agitation making up for the lack of heat. This is an excellent method for commercial or used as a preconditioner prior to extraction. If the technician does not break in the brush or does not apply enough shampoo to lubricate the fibers, damage may occur to cut pile carpets. Wet or dry vacuuming removes the suspended soil and detergent.

This method is called _____

80. This method is extremely popular in commercial cleaning. A rotary machine fitted with absorbent pads is used. Detergent is sprayed onto the carpet and the absorbent pad. Another method incorporates dipping the pads into a bucket of detergent. During the spin buffing phase of soil suspension, the bonnet (pad) attracts or absorbs the soil. Technicians need to monitor the pad and turn it over or replace the pad when it becomes filled with soil. This is an excellent method for maintenance or appearance cleaning. This is considered an interim cleaning method and should be extracted after 2-3 cleanings.

This method is called _____

Bonus questions for your group.

You start to clean a home and come across 3 large blackish stains near the back door. They look to be filled with residue and have an odor of urine. How do you proceed?

You are at a customer's house with a strong cat urine odor. You have explained your deodorization process and the customer says she can't afford to deodorize and tells you to clean only. How would you handle this?

Your customer's dog chewed up an ink pen. Your customer tried a few spotters on it. How should you proceed?

You have just been called to the local greasy spoon restaurant which is about to be shut down by the Board of Health. You can hardly find the carpet under the grease. How would you clean this?

You just won a contract for 10,000 square feet of carpet tile. The carpet is in the lobby and floors 3-6. The 6th floor has multiple spills. Their janitorial staff seems to be making the spots bigger. How will you clean this building?

You encounter an unknown spot. What is your procedure?

REVISED RULES AND REGULATIONS FOR IICRC



CERTIFICATIONS AVAILABLE BY EXAMINATION

| | | |
|--|--------|----------|
| <u>CERTIFIED CARPET CLEANING TECHNICIAN</u> | (CCT) | Exam 101 |
| <u>CERTIFIED RUG CLEANING TECHNICIAN</u> | (RCT) | Exam 141 |
| * Prerequisites: IICRC Certification in CCT or CCMT, and UFT | | |
| <u>CERTIFIED COMMERCIAL CARPET MAINTENANCE TECHNICIAN</u> | (CCMT) | Exam 201 |
| <u>HEALTH AND SAFETY TECHNICIAN</u> | (HST) | Exam 202 |
| <u>CERTIFIED STONE, MASONRY & CERAMIC TILE CLEANING TECHNICIAN</u> | (SMT) | Exam 241 |
| <u>CERTIFIED UPHOLSTERY & FABRIC CLEANING TECHNICIAN</u> | (UFT) | Exam 301 |
| <u>CERTIFIED LEATHER CLEANING TECHNICIAN</u> | (LCT) | Exam 311 |
| <u>CERTIFIED WATER DAMAGE RESTORATION TECHNICIAN</u> | (WRT) | Exam 501 |
| <u>CERTIFIED CARPET REPAIR & REINSTALLATION TECHNICIAN</u> | (RRT) | Exam 601 |
| <u>CERTIFIED COLOR REPAIR TECHNICIAN</u> | (CRT) | Exam 701 |
| <u>CERTIFIED FLOOR CARE TECHNICIAN</u> | (FCT) | Exam 890 |
| <u>CERTIFIED FIRE & SMOKE RESTORATION TECHNICIAN</u> | (FSRT) | Exam 901 |
| * Academic: Must attend an approved course with fourteen (14) hours of classroom instruction and pass appropriate exams with 75% or higher. | | |
| <u>CERTIFIED ODOR CONTROL TECHNICIAN</u> | (OCT) | Exam 401 |
| * Academic: Must attend an approved course with eight (8) hours of classroom instruction and pass exam with 75% or higher. | | |
| <u>APPLIED STRUCTURAL DRYING TECHNICIAN</u> | (ASD) | Exam 511 |
| * Academic: Attend approved 3-day course with at least 24 hours of classroom instruction and pass exam with 75% or higher. | | |
| * Prerequisite: IICRC Certification in WRT | | |
| <u>APPLIED MICROBIAL REMEDIATION TECHNICIAN</u> | (AMRT) | Exam 521 |
| * Academic: Attend approved 4-day course with at least 28 hours of instruction (20% hand-on) and pass exam with 75% or higher. | | |
| * Prerequisite: IICRC Certification in WRT | | |
| <u>APPLIED MICROBIAL REMEDIATION SPECIALIST</u> | (AMRS) | |
| * Prerequisites: AMRT; and HST or an OSHA 10 hour General Industry Health and Safety course, or other suitable program subject to IICRC approval; and one year verifiable microbial remediation experience <i>after</i> the date of issuance of the AMRT certification; and one of the following within one calendar year immediately before AMRS qualification: 10 verifiable microbial remediation projects or 1000 hours verifiable microbial remediation experience. Verification is by written Witness Statement under penalty of perjury plus an appropriate Project Sheet(s). | | |
| <u>CERTIFIED CARPET INSPECTOR</u> | (SCI) | Exam 801 |
| * Academic: Must attend at least thirty five (35) hours of classroom instruction over a five (5) day period and pass exam with 75% or higher. | | |
| * Prerequisites: IICRC Certification in CCMT or CCT and RRT. In lieu of the RRT, the student may have achieved the Certified Floorcovering Installers Association (CFI) CFI-R1, R2, C1, C2, CFI Master Installer status or attended the CFI Installation for the Inspector program, Installation Training (FIT) program, or achieved Journeyman status in an approved installation program. During the first year after passing the IICRC inspector exam, the individual is required to submit a minimum of ten (10) inspection reports which will be reviewed by the Inspector Committee. Inspector status will not be awarded until such time these reports are approved by committee. | | |
| <u>INTRODUCTION TO SUBSTRATE SUBFLOOR INSPECTION</u> | (ISSI) | Exam 811 |
| <u>MARBLE & STONE INSPECTOR</u> | (MSI) | Exam 821 |
| * Prerequisite: IICRC Certification in ISSI and FCT | | |

RESILIENT FLOORING INSPECTOR

(RFI)Exam 831

- * Prerequisite: IICRC Certification in ISSI and FCT

CERAMIC TILE INSPECTOR

(CTI)Exam 841

- * Prerequisite: IICRC Certification in ISSI and FCT

WOOD LAMINATE FLOORING INSPECTOR

(WLFI)

Exam851 & 852

- * Prerequisite: IICRC Certification in ISSI and FCT
- * Academic for all hard surface inspection courses: Attend approved course with at least 14 hours of classroom instruction and pass exams with 75% or higher.

ADVANCED DESIGNATIONS (NO EXAMINATION)

JOURNEYMAN TEXTILE CLEANER

(JTC)

Twelve (12) months active service in the industry after original certification date, plus attainment of specific designations as listed below. Designation will automatically be awarded upon attainment of the proper credits

- * Certification in(CCT or CCMT) and UFT and either (OCT, CRT or RRT)

JOURNEYMAN FIRE & SMOKE RESTORER

(JSR)

Twelve (12) months active service in the industry after original certification date plus attainment of specific categories as listed below.

- * Certification in UFT, OCT and FSRT

JOURNEYMAN WATER RESTORER

(JWR)

Twelve (12) months active service in the industry after original certification date plus attainment of specific categories as listed below.

- * Certification in (CCT or CMT), WRT and RRT

MASTER TEXTILE CLEANER

(MTC)

A minimum of three (3) years after original certification date plus attainment of specific certifications as listed below.

- * Certification in (CCT or CCMT), UFT, OCT, (RRT or BRT) and CRT

MASTER FIRE & SMOKE RESTORER

(MSR)

A minimum of three (3) years after original certification date plus attainment of specific certifications as listed below.

- * Certification in (CCT or CCMT), UFT, OCT, FSRT and (HST or equivalent)

MASTER WATER RESTORER

(MWR)

A minimum of three (3) years after original certification date plus attainment of specific certifications as listed below.

- * Certification in (CCT or CCMT), RRT, WRT, ASD, AMRT/S and (HST or equivalent)

IICRC TESTING FEE STRUCTURE

| | |
|--|----------|
| <u>All Technician Exams (excluding AMRT & Inspector):</u> | \$65.00 |
| <u>AMRT and INSPECTOR:</u> | \$150.00 |
| <u>Retest:</u> | \$25.00 |

RETESTING

If technician doesn't pass an exam and wishes to retake, there will be a fee of \$25. Only two retakes are allowed. Exam must be retaken within 90 days of receiving test results otherwise re-attendance will be required before testing can be done again.

ANNUAL REGISTRATION FEE

After one (1) year, registrant will receive annual renewal billing. If certified in 1 or 2 categories, fee will be \$30 annually, 3 and 4 categories is \$40 and 5 or more categories is \$50 annually. Master status will be an additional \$10.00. Applied Microbial Remediation certification will be \$60.00 annually. If registrant lets

certification lapse for a period of over twelve (12) months, he or she will be required to re-attend an approved school, retake exam and pay appropriate fees. If registrant wishes to reinstate certification within the twelve (12) month period, outstanding fees and fulfillment of continuing education credits will be required. Registrants must follow the Code of Ethics or be subject to sanctions up to and including loss of certification.

CERTIFIED INSPECTOR: Once the inspector has passed the probationary requirements, he or she may choose to be listed as “Practicing” or “Credentialed”. Practicing inspectors will pay \$80.00 annually for fees with listing on the #800 IICRC Referral System and the web site, while Credentialed will pay \$40.00 per year with no listing.

CERTIFIED FIRMS: A Certified Firm Application Request Form must be requested and returned to IICRC with a nonrefundable \$25.00 processing fee. Upon approval of the request form, the firm will be sent Application for Certified Firm. The Application for Certified Firm must be forwarded to headquarters with the annual fee of \$125.00. This is a separate fee from the \$25.00 processing fee and is also nonrefundable. Once Certified Firm status is granted, the firm is immediately listed on the #800 IICRC Referral System as well as the IICRC web site at www.iicrc.org. The Certified Firm is also eligible at this time to use the registered trademark for advertising purposes.

**THE IICRC RESERVES THE UNQUALIFIED RIGHT TO CHANGE AND REVISE THE
POLICIES, PROCEDURES AND REQUIREMENTS.**

You may review the Privacy Policy at www.iicrc.org/privacypolicy

Revised 10/06



Institute of Inspection, Cleaning and Restoration Certification
 2715 East Mill Plain Blvd
 Vancouver, WA 98661
 (360) 693-5675 fax (360) 693-4858
 e-mail: info@iicrc.org

CERTIFIED FIRM APPLICATION REQUEST FORM

Name: _____ Title: _____

Company Name: _____

Company Address: _____

City: _____ State/Prov: _____ Zip/Postal Code: _____

Country: _____ E-Mail: _____

Phone: _____ Fax: _____

If you know the names of IICRC Certified Technicians currently employed by the firm, please list their names here:

Request for Certified Firm Application fee is \$25.00 (U.S. Funds) and must accompany this form. Fees are nonrefundable.

Check or Money Order enclosed or:

Please charge my: Visa MasterCard American Express

Account number: _____ Expiration date: _____ V-Code: _____

Cardholder Name: _____

Signature: _____

Send fee along with this completed request form to:

IICRC

2715 East Mill Plain Blvd
 Vancouver, Washington 98661

In addition to the application fee, the annual fee for Certified Firms status is \$125 (U.S. funds) and must accompany your final application.

If the firm does not meet the requirements to become an IICRC Certified Firm upon submission of this request, the pending application will be held for six months.

Process for becoming an IICRC Certified Firm

Firms must first fill out a Certified Firm Application Request Form and submit to IICRC headquarters with a non-refundable \$25 application fee. The Certified Firm Application Request Form is included with these instructions.

Once the request form is received and reviewed to make sure the Certified Technicians are still with the firm and have a current registration, the firm will be sent a Certified Firm Application and Code of Ethics.

The firm must sign and return a completed application and the IICRC Certified Firm Code of Ethics, along with a copy of its business license (if applicable), proof of insurance, and a non-refundable \$125 for the first year's registration fees.

If a firm does not meet the requirements to become an IICRC Certified Firm upon submission of a Certified Firm application, the pending application will be held for up to six months. During this period, the firm is allowed to take the necessary steps to meet the requirements.

All Certified Firms will have a common anniversary date of December 1 of each year. The first annual renewal bill will be prorated based on the acceptance date of the original registration. For example, if the firm became registered on June 1 of the year at which time it paid the \$125 annual registration, the annual renewal bill in November would be \$63.00. Thereafter, the annual renewal bill will be equal to the full annual renewal amount set by the IICRC Board of Directors.

When a firm is 90 days delinquent on its fees, the firm will be dropped from the roster. The firm may be reinstated when requirements are met and fees are paid.

Certified Firms are not eligible to order supplies or receive Certified Firm credentials until such time they meet all requirements.

Only Certified Firms may display the registered trademark.



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| |
|---|
| For IICRC Use Only Approved by: _____ Date: _____ No. Of Credits _____ |
|---|

APPLICATION FOR IICRC CONTINUING EDUCATION CREDITS

Name _____ Date _____
 Company _____ Register # _____
 Address _____ Phone(____) _____
 City _____ State _____ Zip/Postal Code _____
 Event Date _____ Event Sponsor _____
 Event Description _____

Application must be signed by an authorized individual such as School Instructor, Association President, Executive Administrator or a pre-approved individual.

Sign _____ Print Name _____
 Title _____ Date _____ Phone (____) _____

APPROVED EVENT

- Attendance at Approved Schools.
- Attendance at Association sponsored Conventions, Workshops, Seminars, Chapter Meetings, and other educational functions as pre-approved.
- Attendance at supplier sponsored seminars as pre-approved.
- Attendance at Carpet Markets and or Carpet Market workshops.
- Attendance at other IICRC pre-approved functions.

RULES

- All applications for credits must be witnessed by the sponsoring organization. This can be accomplished by signature of organization official or submission of a verified attendance form from the organization.
- All applications must be submitted on the official IICRC application form which requires signature of an organization official.
- Applications for approval of events must be made on the IICRC official form, in writing and presented to IICRC 30 days prior to the date of the event. No exceptions will be made.
- Applications for approval will be processed by the IICRC Registrants Standards Committee. No other authorization will be accepted.
- All requests must be mailed to IICRC headquarters.

COPIES CAN AND SHOULD BE MADE OF THIS APPLICATION FOR FUTURE USE.

Review #1

Fibers

1. *Natural fibers are very absorbent which means they dye easily, stain easily, and take longer to dry.*
2. *The most popular synthetic fiber is nylon.*
3. *Olefin loves oil and hates water.*
4. *Wool and silk are examples of protein fibers.*
5. *Nylon can be dissolved by formic acid.*
6. *Wool will not burn and smells like a wet dog when wet..*
7. *The epidermis of a wool fiber can be damaged by alkalinity.*
8. *Bleach can dissolve a wool or silk fiber.*
9. *Polyester is not a good choice for a commercial building.*
10. *Olefin is always solution dyed but crushes easily.*
11. *All synthetic fibers are extruded through a spinneret.*
12. *The acrylic fiber is a synthetic substitute for wool.*
13. *Nylon is attracted to acid dye stains and should be cleaned with a pH under 10.*
14. *When a synthetic fiber is burned it leaves a hard bead when a natural fiber is burned it leaves an ash.*
15. *When nylon is burn tested it smells like plastic, olefin smells like asphalt, polyester smells like fruit wool smells like burnt hair, cotton or jute smells like paper, acrylic smells like burnt meat.*

Review #2
Yarns & Dyeing

1. *Synthetic fibers are created through a process called extrusion.*
2. *Synthetic fibers can be either filament or cut into staple.*
3. *Loose staple fiber is normal in a cut pile and called shedding.*
4. *Olefin can be damaged by heat.*
5. *Olefin and polyester are attracted to oily soil, this is referred to as being oliophilic.*
6. *Bulked continuous filaments are referred to as BCF.*
7. *When 2 or more yarns are twisted together they are called plied.*
8. *A carpet that is dyed in a pattern is called a printed carpet.*
9. *A carpet that has not been dyed is called greige goods.*
10. *The most popular form of dyeing for residential carpet is called piece dyeing. These two methods are continuous and beck dyeing.*
11. *Wool cannot be solution dyed.*
12. *A pigment is insoluble a dye is soluble.*
13. *Optical brighteners can cause permanent yellowing and void stain resist warranties.*
14. *Pooling, watermarking, and shading are not considered defects by the carpet manufacturers.*
15. *Bleeding requires water crocking requires agitation.*

Review #3
Manufacturing & Styles

1. *Woven carpet is made on a loom and the yarns consist of a warp yarn a weft yarn and a face yarn.*
2. *A tufted carpet consists of a face yarn stitched in to a primary backing with latex bonding it to a secondary backing.*
3. *Most tufted carpet has a synthetic backing but some woven carpet has cotton or jute yarns that can shrink.*
4. *The most popular cut pile carpet style is called Saxony.*
5. *Olefin Berbers can be difficult to clean because of the cleaning wand bouncing and excess moisture and soil wicking.*
6. *An inexpensive cushion will cause the carpet to crush.*
7. *The most popular style of cushion is called rebond.*
8. *All stretched in carpet must be installed using a power stretcher.*
9. *The CRI Standard for installation of residential is called CRI 105.*
10. *Tufted carpet must have enough latex to hold the yarns in and can be damaged by excessive use of solvents.*
11. *The separation of primary and secondary backing is called delamination.*
12. *Seam sealer prevents the seams from separating.*
13. *A stretch in carpet that ripples normally settles when dry.*
14. *Be careful with solvents on a direct glue carpet.*
15. *Download CRI installation standards from www.carpet-rug.org*

Review #4
Soiling & Principles

1. Soil is normally acidic on the pH scale.
2. The highest percentage of soil is insoluble.
3. The best way to remove dry soil is by vacuuming.
4. Soil shading is caused by abrasion of plastic fibers.
5. The principle of dry soil removal is frequently skipped.
6. The cleaning pie consists of Time Agitation Chemical Temperature or CHAT.
7. The second principle is soil suspension.
8. Extraction can include vacuuming.
9. Water-soluble soils cannot be removed by solvents.
10. Hair, sand and skin are considered insoluble.
11. Empty a vacuum bag when it is 1/2 to 2/3 full.
12. A micron or micrometer is 1 millionth of a meter.
13. Fast drying prevents slip and fall hazards.
14. A carpet should be groomed to remove wand marks and help the protector be distributed evenly.
15. The technician is responsible for over wetting Some of this may be caused by lack of equipment maintenance.

Review #5 Methods

- 1. Regardless of the method chosen the principles must be followed.***
- 2. The oldest method of cleaning is shampooing.***
- 3. A very popular interim method for commercial maintenance is absorbent pad.***
- 4. Hot Water Extraction has the most chances of overwetting.***
- 5. Systems using granular detergent are called absorbent compound.***
- 6. A system using a foaming surfactant using a cylindrical brush is called dry foam.***
- 7. The method favored by many carpet manufacturers is H W E.***
- 8. When using an absorbent pad the pad should be changed when it stops absorbing soil.***
- 9. Systems using rotary action are more likely to cause fiber distortion.***
- 10. Propane tanks should be mounted on the outside of the van.***
- 11. All trucks must carry MSDS, and a fire extinguisher.***
- 12. Replace any plugs that are cut or missing the ground.***
- 13. Replace any solution hoses that are worn.***
- 14. Park your van so that exhaust faces away from the home.***
- 15. Wicking is minimized in a commercial building with multiple spills when using an encapsulation system.***

Review #6
Chemistry

1. *The pH chart ranges from 0 to 14 with 7 being neutral.*
2. *Any water-based solution below 7 is acidic above 7 is alkaline.*
3. *A surfactant allows penetration into the fabric being cleaned.*
4. *A builder adds alkalinity and softens water while emulsifying oily and greasy soils.*
5. *Hydrophilic loves water hydrophobic hates water.*
6. *A surfactant resembles the candy tootsie roll pop.*
7. *Soaps do not work as well as detergents in hard water.*
8. *The universal solvent that dissolves the most substances is water.*
9. *The pH of toothpaste is on the alkaline side of the pH scale.*
10. *The pH of a browning removal product is on the acid side.*
11. *Rust is considered alkaline so to remove use an acidic product.*
12. *Most disinfectants contain cationic surfactants.*
13. *Mixing a cationic surfactant with an anionic surfactant will make a gooey mess.*
14. *Doubling the amount of detergent will most likely leave additional residue in the carpet making it feel stiff.*
15. *Adding a scented deodorizer leaves a pleasant scent but does not neutralize the odor. It dissipates as it dries.*

Review #7
Chemicals & Spotting

1. *The workhorse of cleaning products is the preconditioner.*
2. *A(n) alkaline detergent is used on soiled synthetic fabrics.*
3. *A(n) acid rinse is the best choice for neutralizing a preconditioner.*
4. *For all synthetic carpet the safest pH to use is under 10.*
5. *A fluorochemical repels all three types of soils.*
6. *A gallon contains 128 ounces.*
7. *A spot adds substance to the carpet; a stain adds dye.*
8. *Asking the customer, noting the location, and using your senses helps to identify the spot.*
9. *A(n) oxidizer adds oxygen to a spot a reducer reduces oxygen.*
10. *Use solvents that have a high flash point and be sure to ventilate the area.*
11. *To remove a coffee spot use a tannin spotter.*
12. *When using rust removers neutralize and rinse.*
13. *Acne medicines contain benzoyl peroxide that can bleach fabric.*
14. *Enzyme spotters need heat, moisture and longer dwell time.*
15. *Nail polish, lipstick or paint will need a POG to remove.*

Review #8
Procedures

1. A thorough preinspection and communication with the customer will prevent many problems.
2. Wear a clean uniform with an I D badge and smile.
3. Ask about any pets before you leave the door open.
4. Introduce the other tech as your partner even if he is a helper.
5. Start in the furthest area of the house with the customer's permission.
6. Even if the customer has vacuumed you still need to vacuum.
7. Remember to under promise and over deliver.
8. Clean the magic square in the most soiled area.
9. Follow up the preconditioner with agitation in the traffic areas.
10. Following extraction groom all cut pile carpet.
11. Be sure to wipe up all hard surface areas to avoid slip and fall hazards.
12. Tab and block all furniture that has been moved.
13. Use air movers to speed the drying process.
14. Recommend how to keep her carpet looking good by frequent vacuuming and proper removal of spots.
15. Dump wastewater in an approved receptacle.