

Fabric Cleaning Specialist



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Are you sure you want to be a fabric specialist?

If you think you can clean fabrics because you are an expert carpet cleaner you will be right about half the time. Those are the times that you are cleaning olefin, nylon, polyester and acrylic. The rest of the time you will be cleaning cotton, linen, rayon and even a little silk. If you aren't cautious you will have a living room full of furniture that doesn't match.

Let's look at the risks of fabric cleaning, real ones and a few that fall in the category of urban legends.

Browning – Old time cleaners remember browning from the days of jute-backed carpet. Today's carpet has synthetic backing and **cannot** brown. Fabric is the flipside of carpet. A high percentage of fabric being sold today is made from cotton or a cotton blend and a small percentage of linen. Both materials are cellulosic and are prone to browning in the presence of water and accelerated by alkalinity. Throw in some rayon and you have many opportunities for browning. Understanding the chemistry of fabric cleaning can prevent browning.

Bleeding – Synthetic carpet rarely bleeds. Fabric, on the other hand can bleed when you least expect it. Alkalinity, heat and water all play a part in bleeding. Pretesting, inspection and chemistry can prevent bleeding.

Shrinkage – Once again synthetic material rarely shrinks. Not the case with cotton. Just look at all those cotton t-shirts in your drawer. This can be prevented with pretesting, inspection and close attention to drying.

Color loss – This is very prevalent in polished cotton or chintz fabrics. The pattern is screen printed and not very durable. When the piece is heavily soiled the printed design is obscured by soil. Over a period of time agitation in conjunction with soiling and poor maintenance the pattern disappears. The unsuspecting cleaner removes the soil and is blamed for removing the pattern. Preinspection and communication can prevent this problem.

Haitian Cotton – If you listen closely you can hear the anguished cries of the cleaners who have suffered the tragedy of Haitian Cotton. Today real Haitian Cotton (not synthetic look a likes) is harder to find than Waldo. Canvas and Haitian Cotton are processed less than other cottons. What do these all have in common? They all can be prevented. If you are ready to become a Fabric Specialist, turn the page.

The characteristics of a good fabric specialist

Many carpet techs love to take on empty houses or a huge commercial job because they can really fly. Ask them to clean a sofa with a pleated skirt and 6 toss pillows and they mention that they will need to reschedule it for another time. Why the hesitation?

1. Fabric cleaning is detail work. Large amounts of patience needed.
2. Fabric cleaning demands more knowledge and expertise.
3. Fabric cleaning is more fatiguing due to the handwork. Fortunately new ergonomically designed tools can help alleviate this problem.
4. Natural fibers seldom clean as well as synthetics and can cause disappointment for both the tech and the customer. A thorough
5. preinspection, testing and communication of the cleaning as well as risk potential to the customer prevents this disappointment. The specialist sets the level of expectation with good verbal skills.

Customer expectations

1. Many customers are not even aware that fabrics can be cleaned.
2. They believe that the magic fabric protector the salesmen sold them will prevent the sofa from soiling.
3. They may expect the fabric to look brand new after cleaning.
4. They don't have much input on the carpet selection but spend a great deal of time selecting fabrics. Even worse is when an interior decorator helps choose the fabric. Fashion beats out practicality.
5. Customers have no idea what it should cost to clean a sofa. The only comparison they have is to carpet cleaning and their experience to pricing comes from the coupons they receive in the mail.

Fabric specialist responsibility

After a thorough inspection including fiber ID and colorfastness testing the technician should communicate the findings and set the expectations of the consumer. After this has been done the technician should **clean the fabric to the best of his ability without affecting the color or the texture of the fabric.**

Insurance – before cleaning any fabric make sure you have the right insurance. **Waiver of Care, Custody and Control**

Fibers are broken into three major categories:

Natural - derived from plants or animals.

- Protein (animals/silkworms)
 - Wool
 - Silk
- Cellulosic
 - Cotton
 - Linen

Manmade – according to the Federal Trade Commission this category is a manufactured fiber made of regenerated cellulose. (**Clean like cellulose**)

- Rayon
- Acetate

Synthetic – derived from petrochemicals.

- Nylon
- Olefin
- Polyester
- Acrylic
- Triexta

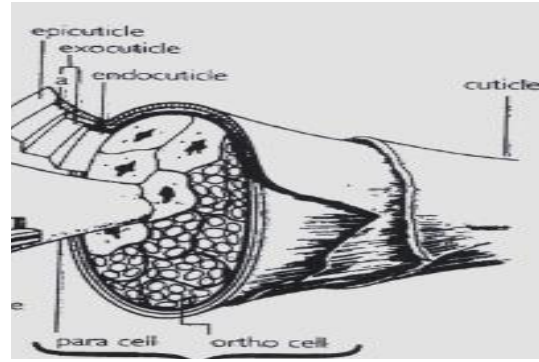
Natural and synthetic fibers differ in their ability to **absorb** moisture.

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 due to absorbency.

Protein Fibers

Wool is obtained from the fleece of sheep or lamb or the hair of the angora or Cashmere goat (and may include hair of the camel, alpaca, llama, and vicuna.)



Use products tested safe for wool.

Characteristics:

- Fiber been in use over 2000 years
- Naturally resilient (natural crimp)
- Good abrasion resistance
- Low luster
- Dyes easily
- Cleans well – clean with products approved for wool cleaning
Natural soil resistance, releases soil easily
- Natural protective membrane repels moisture
- High moisture absorbency, yet scales inhibit wicking, wets slowly
- Natural fire resistance

Concerns:

- ✓ High pH or highly buffered chemicals can damage outer layer (epidermis/cuticle)
- ✓ Silicones can cause resoiling
- ✓ Chlorine bleach 6%(sodium hypochlorite) dissolves wool
- ✓ Stains are very difficult to remove
- ✓ Bleeding and crocking are more of a concern
- ✓ Aggressive agitation can damage epidermis
- ✓ Expensive
- ✓ Insect damage

Silk - normally found only in rugs

Characteristics:

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

Concerns:

- ✓ Yellows with age
- ✓ Spots easily
- ✓ Texture distorts easily
- ✓ Damaged by high alkalinity
- ✓ Perspiration can cause splitting

Cocoons



Moth

Worms feeding on mulberry leaves



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.

Cellulosic

Cotton – the most popular fiber in the world.

The cotton plant is a **seed fiber** containing up to 8 seeds. As the seeds develop they are covered with a white fiber. When the cotton plant is mature the fiber has layers of cellulose surrounding a central canal called **lumen**. When the cotton boll bursts the fiber is exposed to the sun and the lumen dries up causing the fiber to flatten and twist. The cotton is harvested and the seeds are removed during the **ginning** process. The seeds are processed into gin seed oil. The fibers are separated into the long desirable fibers for fabrics and the shortest fibers (lintners) are used as a cheap source of cellulose for rayon.



The long fibers are packaged into bales and shipped to the mills where they go through a **carding** and **combing** process to remove dust and twigs. The fabric can be **mercerized** (treated with caustic soda) causing a permanent swelling of the fiber that **strengthens** the fabric and adds greater luster. The fibers are spun and made into fabric. Haitian Cotton and canvas miss a few steps and are prone to browning. Lignin is the binder in cellulose that can dissolve during cleaning causing browning. It is soluble in acids.

Characteristics:

- Dyes easily
- Great hand (feels soft)
- Frequently blended with other fibers
- Most elastic of the cellulosic fibers
- Cotton is 10-20% stronger when wet and used as a warp yarn.
- Very absorbent 7-8% moisture regain (accepts dye easily)
- No static buildup

Concerns:

- ✓ Easily browns due to high cellulosic (lignin) content

- ✓ Shrinkage due to natural yarns absorbing & swelling
- ✓ Stains easily due to high absorbency
- ✓ Damaged by oxidizers
- ✓ Poor abrasion resistance especially around arms
- ✓ Can support biological growth
- ✓ Extended exposure to sunlight will cause deterioration

Linen – is derived from the stem of the flax plant.

Before cotton was available in Europe linen was used in place of cotton. Because linen is taken from the woody stem of the flax plant it has to be partially rotted (**retting**). Submerging the flax straw into water for 6-20 days loosens the bark. Breaking and scutching then separates the straw. The fibers are then combed and aligned to prepare for spinning into yarns.

Characteristics:

- Natural linen has a light cream to dark tan coloring.
- More lustrous than cotton, twice as strong as cotton
- Stronger wet than dry
- Good moisture absorbency 11-12% moisture regain
- Better resistance to sunlight than cotton

Concerns:

- ✓ Easily browns due to high cellulosic (lignin) content
- ✓ Shrinkage
- ✓ Stains easily
- ✓ Resilience worse than cotton, turns brittle with age
- ✓ Poor abrasion resistance especially around arms
- ✓ Turns darker when wet, turns lighter as it dries
- ✓ Can support biological growth if left wet
- ✓ Dyed linens can crock or bleed

Man-Made Fibers

Acetate – while considered a manmade fiber like rayon it is not considered cellulose and doesn't have the problems of cellulose. Purified cellulose is mixed with acetic acid then with acetic anhydride.

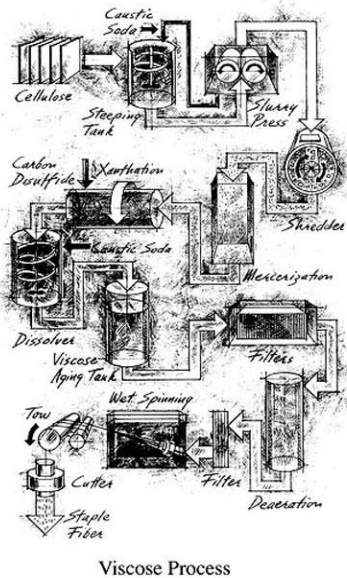
Characteristics:

- Good luster
- Great drapability
- Fair moisture absorbency 6% moisture regain
- Good resistance to shrinkage
- Feels soft

Concerns:

- ✓ Poor abrasion resistance, weakened by alkalinity
- ✓ Acetone (fingernail polish remover) will dissolve acetate
- ✓ Weaker wet than dry

Rayon—the first man-made fiber. It was designed to replace silk. Fabrics and rugs labeled art silk are really **rayon**. First produced in U.S. in 1910.



Wood pulp or cotton linters is immersed in a solution of caustic soda. This creates an alkali cellulose material that is extruded in fiber form. Color pigments may be added during the extrusion process. Because of the reversion of the soluble compound to cellulose, rayon is called a regenerated

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Characteristics:

- High absorbency 11-12% moisture regain, as absorbent as cotton
- Soft hand
- Accepts dyeing easily
- Good drapability
- Sometimes used to imitate silk (art silk)

Concerns: all the problems of cotton

- ✓ Shrinkage (poor dimensional stability)
- ✓ Bleeding
- ✓ Browning
- ✓ Poor abrasion resistance
- ✓ **Weakest fiber when wet** approximately 50%
- ✓ Fiber distortion

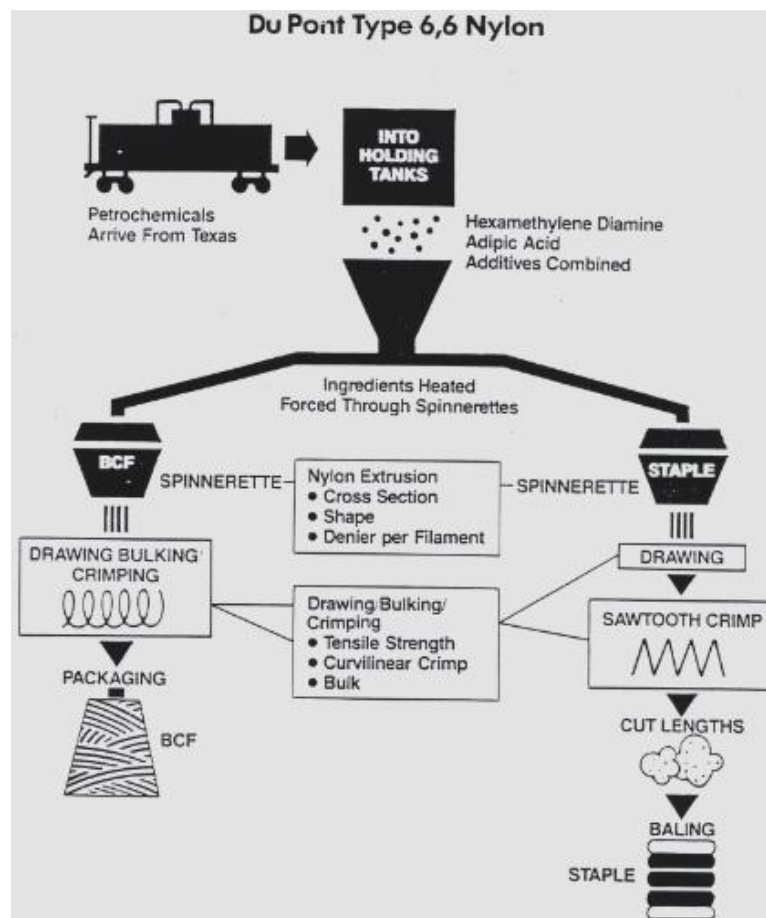
Rayon may be referred to as **Viscose**. Clean like cotton fabrics. This may also be branded as **Lyocel**

Review #1
Natural Fibers

1. *Clean fabric as well as you can without affecting the _____ or _____.*
2. *Natural fiber fabrics are very _____.*
3. *Cotton, linen, and hemp are examples of _____ fibers.*
4. *Wool and silk are examples of _____ fibers.*
5. *Natural fiber fabrics can shrink, _____ or _____.*
6. *Wool should be cleaned with chemicals _____ for wool.*
7. *The _____ of a wool fiber can be damaged by _____.*
8. *_____ can dissolve a wool or silk fiber.*
9. *Linen _____ when it gets wet.*
10. *Silk _____ easily and should be cleaned with a _____ pH.*
11. *Cotton comes from a _____ and linen comes from the _____ of a plant.*
12. *The binder holding cells together in cellulose is called _____.*
13. *Cotton goes through _____ to strengthen and add luster.*
14. *When the cotton is harvested it goes through _____ to remove the seeds. It also is _____ & _____ to remove dirt & twigs.*
15. *Rayon is _____ when wet and should be cleaned similar to _____.*

Synthetic fibers – the extrusion process

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 and stretched and bulked, resulting in **BCF** – **bulk 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 – may be the king of carpet but only a prince in the fabric world.

Characteristics:

- Great resiliency (ability to spring back after compression)
- Accepts dyes easily (mostly acid dyes) especially for printing
- Cleans well
- Resists abrasion
- Dissolves in formic acid

Concerns:

- ✓ Attracted to acid dyes (no acid-dye blockers in fabric)
- ✓ Pilling takes place when a fabric has been abraded causing fiber ends to break, migrate to the surface and form small fuzzy balls. Pilling is a serious problem in strong fibers such as nylon and can be removed by shaving or shearing.

Polyester – most popular synthetic fiber

Characteristics:

- Great hand
- Excellent stain and fade resistance
- Good color clarity
- Good abrasion resistance
- Cleans and dries well due to low moisture absorbency
- Can be recycled from plastic bottles
- Dyed with disperse dyes, not attracted to acid dyes
- Very popular blend with cotton
- Dominates the microfiber market

Concerns:

- ✓ Poor moisture absorbency moisture regain .2-.8%
- ✓ Attracted to oily (oleophilic) soils causing yellowing
- ✓ Bacteria grows in soiled, perspiration soaked fabric

Acrylic – originally marketed as the synthetic wool because of its similar characteristics. Frequently used in velvet weaves.

Characteristics:

- Always a staple fiber
- Usually solution dyed—giving good bleach resistance
- Good resilience
- Excellent sunlight (UV fading) resistance
- Fabric ages well
- Stronger than wool

Concerns:

- ✓ Poor abrasion resistance
- ✓ Poor soil hiding
- ✓ Heat sensitivity
- ✓ Fair cleaning
- ✓ Shading
- ✓ Holds oily soils

Olefin – also referred to as polypropylene, trade name Herculon.

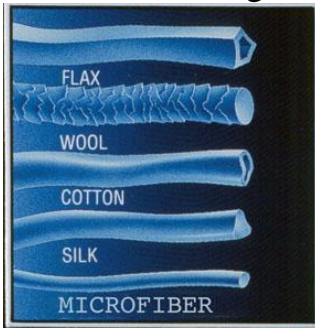
Characteristics:

- Must be solution dyed
- Most stain and fade resistant
- May be bleached with ½-1% chlorine bleach if 100%
- Good abrasion resistance
- Least water absorbent
- Floats on water due to specific gravity less than water
- Cleans well

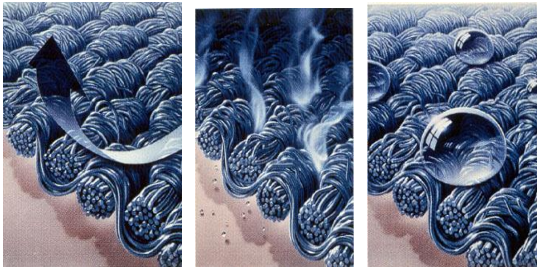
Concerns:

- ✓ Poor resilience
- ✓ Low melting point – friction can melt fiber, hot couplers can melt fibers, use caution with hot tools or chop stroking.
- ✓ Attracted to oily soils (oliophilic)
- ✓ Weakened in sunlight, makes fabric brittle
- ✓ Latex backing damaged by solvents
- ✓ Lowest moisture absorbency

Microfibers – generally applied to fibers less than 1 denier.



Denier refers to the diameter of a fiber. The official definition is the weight in grams of 9000 meters. The finer the denier is the softer the fabric. Microfibers are the hottest selling fabric in the industry because of the way they can imitate other fabrics such as leather and suede.



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Although the spaces between the yarns are too small to be penetrated by liquid water, they are ample for the passage of moisture vapor. This makes microfibers the ideal material for clothing.

Even though microfibers simulate leather, suede and other fabrics they are synthetic fibers and they are cleaned the same way as other synthetic fibers. The one concern is the texture. Treat the fabric as a velvet weave and brush or card the fabric as needed. Being synthetic means the fabric should dry quickly. It is critical to ID the fabric by doing a burn test to determine if it is synthetic or natural. Most microfibers are polyester but there are always exceptions. Microfibers are finer than silk. They hold up to seven times their weight in water.

Leather — is a natural fabric coming primarily from cattle hides. Every hide is unique. Factors such as the age of the hide, heredity and the environment determine the quality of the piece.

Types of leather;

Pure aniline is the finest of hides used for leather. This category draws from only the top 5% of hides. This type of leather improves with age as the patina improves with time.

Full aniline is one notch below pure aniline and has a slight protective finish.

Semi aniline is similar to full aniline but have pigments sprayed on the top and finished to provide better light fastness and scratch resistance.

Corrected grain leather goes through more processing including sanding, buffing, embossing, and heavy pigmenting. This is the minimum recommended for upholstery.

Top grain usually means the grain is not genuine. The real grain is sanded away and an imitation grain is stamped into the leather. If the genuine grain remains, the leather is called full grain or full top grain.

Leather ID do not attempt cleaning without knowing the type of leather.

| | <u>Aniline</u> A | <u>Nubuck</u> N | <u>Protected</u> P |
|----------------|------------------------|------------------------|---------------------------|
| <i>Hand</i> | <i>Soft</i> | <i>Softest</i> | <i>Stiff</i> |
| <i>Absorb</i> | <i>Absorbent</i> | <i>Absorbent</i> | <i>Nonabsorbent pools</i> |
| <i>Scratch</i> | <i>Easy to scratch</i> | <i>Easy to scratch</i> | <i>Hard to scratch</i> |
| <i>Cost</i> | <i>Expensive</i> | <i>Less expensive</i> | <i>Least expensive</i> |

Protected leather is easily cleaned. Nubuck and aniline should be cleaned only after additional training.

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

Chemical tests:

Nylon – formic acid

Wool – sodium Hypochlorite

Olefin – floats on water

Acetate – dissolved by acetone

Fabrics are difficult to ID because of backings, blends and treatments.

| Fiber | Advantages | Concerns |
|--|---|---|
| Wool <i>protein</i> | Resilient, Warm, soft Luxurious Dyes easily Hides soil Cleans well | Damaged by high alkalinity Dissolves in chlorine Acid dyes stain Agitation can damage Expensive |
| Silk <i>protein</i> | Most luxurious Soft hand | Color loss Texture distortion Water/solvent rings Perspiration damages fiber Yellows with age Difficult to clean |
| Cotton <i>cellulosic</i> | Absorbs dyes well Breathes Comfortable Most popular natural fiber Versatile | Stains easily Browns Bleeds Shrinks Slow drying |
| Linen <i>cellulosic</i> | Absorbent Comfortable Fashionable | Stains easily Becomes brittle with age Browns Shrinks Slow drying |
| Rayon <i>manmade</i> | Inexpensive Bright colors | Wrinkles, browns, shrinks, slow drying, weakest when wet |
| Acetate <i>manmade</i> | Sun resistant Shrink resistant | Dissolved by acetone discolors |
| Nylon <i>synthetic</i> | Dyes easily, strong, resilient, Cleans well, abrasion resistant hides soil well, wears well | Acid dyes stain, urine discolors, pilling |
| Olefin <i>synthetic</i> | Solution dyed (colorfast), Cleans well, bleachable, quick drying, inexpensive | Attracts oil, yellowing, pilling, Weakened by sunlight, backings dissolved by solvents |
| Polyester <i>synthetic</i> | Colorfast, cleans well, not attracted to acid dyes, | Attracts oil, yellowing, pilling, nonabsorbent |
| Acrylic <i>synthetic</i> | Wool substitute, colorfast, sun resistant, cleans well | Heat sensitive, non resilient, pooling in velvets |

Review #2 Synthetic Fibers

- 1. Synthetic fibers are created through a process called _____.***
- 2. Synthetic fibers can be either _____ or cut into _____.***
- 3. Nylon _____ easily which means it _____ easily.***
- 4. Olefin fabrics can be damaged by _____ and _____.***
- 5. Olefin and polyester are attracted to _____ soils, this is referred to as being _____.***
- 6. Polyester is frequently blended with _____ fibers.***
- 7. Oily soils not removed from polyester fabrics can cause _____.***
- 8. Polyester fibers are being made using recycled _____.***
- 9. Acrylic fabrics can be damaged by excessive _____.***
- 10. Acrylic is frequently used in a _____ weave.***
- 11. Microfibers are the _____ fiber, with denier of less than ____.***
- 12. Microfibers usually are _____.***
- 13. When doing a burn test if the residue turns to ash you have a _____ fiber. If it melts it is a _____ fiber.***
- 14. The fiber that floats is _____, if it is dissolved by formic acid it is a _____ fiber. If it is an ash and smells like paper it is _____.***
- 15. Burn tests are not necessarily _____ but should always be done.***

Yarn manufacturing

For fibers to be woven, tufted or knitted into fabric they must be formed into continuous strands called yarns. The type of yarn chosen affects its appearance, durability and the way the fabric feels and drapes.

Fibers that are extruded begin as **continuous filaments** but are normally cut into small pieces called **staple**. Staple yarns are popular because they resemble the look and feel of natural fiber. Except for silk all natural fibers are staple fibers.

Staple or spun yarns need additional processing:

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.

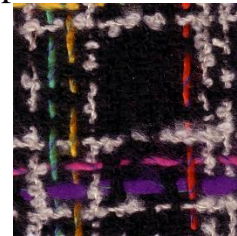
Spinning is the actual formation of the yarn.

Plying is the process where 2 or more yarns (2 ply) are twisted together to form the final plied yarn for tufting. Bulky yarns are usually loosely twisted and should be agitated in the direction of the yarn with a soft brush.



Yarns made to create interesting decorative effects are called **novelty yarns** or fancy yarns. Most novelty yarns will have three parts:

1. **Core**
2. **Effect**
3. **Binder**



Examples of these would be found in:

Boucle

Boucle yarns are plied yarns. The **effect** yarn forms irregular loops around a base yarn (**core**). Another yarn (binder) ties the effect yarn to the base.

Ratine yarns are similar in construction to boucle.

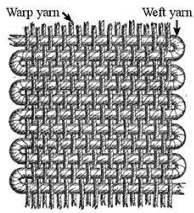
Slub yarns are created by varying the twist in the yarn, allowing areas of looser twist to be created. This creates a long, soft, thick area called a slub. This causes weaker areas in the yarn. Be careful with agitation.

Seed yarns are made of loosely twisted yarns and are held in place by a binder yarn. These yarns are weak and are used in the filling to achieve decorative effect.

Caution – if agitation is required brush in the lengthwise direction of the yarn with a soft horsehair brush.

Fabrics can be created in a variety of ways including:

- **Weaving**
- **Tufting**
- **Flocking**
- **Quilting**



Weaving –constructed by interlacing one yarn with another. The lengthwise yarn is referred to as the **warp**. The warp is flat and shiny. The crosswise or horizontal yarn is called the filling or **weft** yarn. These yarns normally intersect each other at right angles. Woven fabrics are made on a loom such as a **dobby** loom. Looms have been around since ancient times. Modern looms still follow the same process but at super speeds. Durability of the weave is determined by density, construction and the fiber used.

Basic weaves

- **Plain** weave is the simplest and the most common. It consists of interlacing warp and weft yarns over one and under the next. Plain weaves are normally very strong. Variations of this weave include:
 - **Ribbed** – have an unbalanced weave with many small yarns crossing over a number of large yarns.
 - **Basket** – two or more warps and two or more wefts side by side



Plain

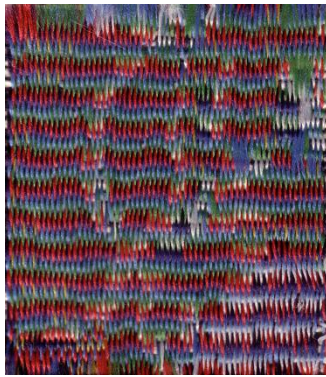
Twill

Satin

- **Twill** weaves can be identified by the diagonal lines that the weave creates on the surface of the fabric. Twill weaves are packed tightly which makes them strong and durable. Herringbone is a twill weave.

- **Satin** weave fabrics are made by allowing yarns to float over a 37 52 number of yarns from the opposite direction. Floats may cross from 4-12 yarns before interlacing with another yarn. They are normally made from high luster filament yarns to produce a shiny finish. They are smooth in texture and shed dirt easily. The durability of satin weaves is related to the density of the weave. Antique satin often uses slub (float) yarns as a decorative effect.

Be careful of snagging the slub yarn. Check your fabric tool for and nicks or burrs before cleaning especially satin fabric.



Back of fabric



Front of fabric

Jacquard weave is identifiable by unzipping a cushion or flipping up the skirt. The back of the fabric is the photo negative of the front. Jacquard fabrics normally have several colors and usually consist of natural fibers. Jacquards have a high potential for bleeding. Jacquards are made on a computer controlled Wilton loom. **Pretest for colorfastness.**

Brocade features elaborate patterns of flowers and figures that is embossed or embroidered. They exist in a wide range of fibers and prices. Shrinkage is always a concern. **Examples of jacquard fabrics:**



Brocade



Brocatelle



Damask

Brocatelle is similar to brocade with figures in high relief.

Damask is normally flatter than brocade and often has a fine weave.

Damask figures often use a satin weave to reflect light from the pattern. The background may be a plain weave for contrast.

Tapestry fabrics have highly patterned designs on the face. The back has the same designs but different colors.

Tapestry



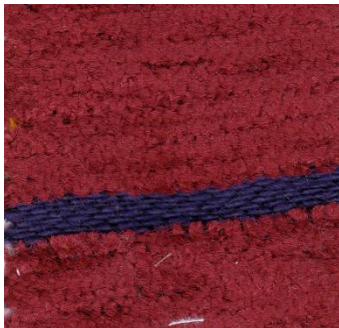
Crewel



Crewel is a plain woven base with a raised surface design, usually wool.

Pile weaving incorporates an extra set of yarns that form the pile. Several types of fabrics are in this category:

- Velvet including embossing with engraved heated rollers
- Velveteen
- Corduroy
- Chenille



Chenille

Corduroy

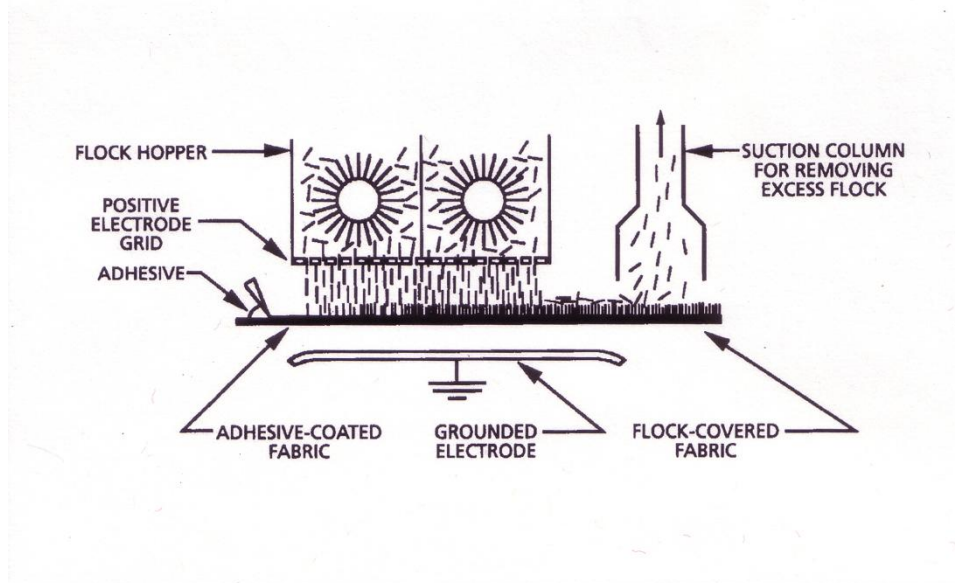
Velvet

Pile fabrics have a large capacity for holding dry soil without appearing soiled. Pre-vacuuming can help prevent soil wicking. Velvet weaves must be groomed to prevent the wet fibers from becoming stiff. Natural fibers must be carded in 4 directions immediately after completing each section. Synthetic velvets can be groomed after completion of the entire piece.

Tufting of fabric is similar to carpet tufting. 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.

Tufted fabrics normally have a coating of latex to lock in the tufted yarns. Solvents can easily damage this latex.

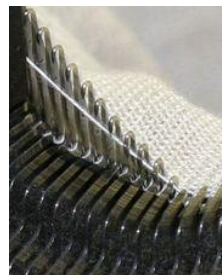
Flocking is a process in which short nylon fibers (tow) are glued on to the surface of a base cloth. The electrostatic method causes the fibers to be attached in an upright position by passing them through an electrostatic field. The fibers pick up the charge and align themselves vertically. Solvents can affect the durability of flocked fabrics. Agitation should be minimized as a carding brush can cause damage.



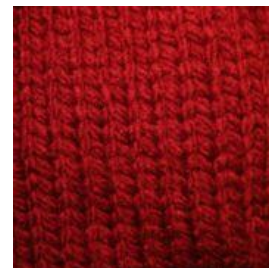
Quilting fabrics use at least three layers. These fabrics resemble a bedspread quilt. A filling material made of cotton batting, down or a polyester fiberfill is sandwiched between two decorative layers. These layers are sewn together with a strong thread to keep the material from shifting. **Due to the additional material and the unknown nature of the filling material using minimal moisture is the key.**



Quilted Fabric



Knitting Machine



Knitted Fabric

Knitting is the construction of fabric by interlocking loops of one or more yarns

Finishes that affect fabric:

Moiré has a watermarking or clouded surface appearance that is sometimes referred to as a wood grain pattern. Moiré patterns are created through a calendaring, a process in which fabrics are passed through a series of rollers under pressure. **Depending on the method used moiré is not considered a permanent effect and may be removed through wear or cleaning.**

Thermoplastic fibers are durable, natural fibers are not. Moiré that is embossed is easily removed by wet cleaning.



Moire finishes are very popular for drapery and for wallpaper.

Polished Cotton is a plain weave solid color (shiny) cotton fabric that is calendered and glazed. **Chintz** is similar except it has a printed design. This style causes problems for technicians. The finish is gradually diminished through friction and abrasive wear combined with oily soil. When the customer flips the cushion over they see the original color and finish and believe the technician can restore the original look.

Test the fabric to see if the glaze has worn off by placing a drop of water on the back skirt. It should bead. Then place one on the cushion or arm and if the glaze is gone the water will immediately penetrate.



Chintz

Review #3 Yarns & Fabrics

- 1. Fibers are blended, carded, spun and plied creating _____.***
- 2. A twill weave is identified by _____ lines.***
- 3. Woven fabric is created on a _____. Lengthwise yarns are called _____ and crossing yarns are called _____ or _____.***
- 4. The most basic weave is called _____ and is the _____.***
- 5. A satin weave is _____ and is identified by the _____ yarns.***
- 6. Caution should be used on a satin weave so as not to _____ a yarn.***
- 7. Jacquard weaves are identified by looking at the _____ of the fabric and can easily _____ with high _____ and _____.***
- 8. Pile weaves include _____ and _____. This weave holds more _____ than other weaves.***
- 9. Chenille is considered a _____ weave.***
- 10. Tufted fabrics must have _____ to hold the yarns in and can be damaged by excessive use of _____.***
- 11. Flocked velvet fabrics are created by _____ nylon _____ to the base cloth. This fabric can be damaged by _____.***
- 12. Quilted fabrics have at least _____ layers and can be easily _____.***
- 13. A _____ fabric has an embossed watermark and can be removed during HWE.***
- 14. Polished cotton has a sheen that is removed over time and through _____. Test this fabric with a drop of _____ on a newer piece.***
- 15. Another name for polished cotton is _____.***

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

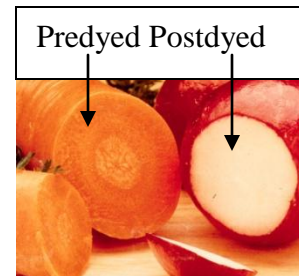
Primary colors – red, blue, yellow

Secondary - colors are blends of primaries.

Methods of dyeing

Predyed:

- **Solution** – adding pigment to the polymer before extrusion.
Olefin must be solution dyed while all extruded fibers can be solution dyed. All extruded fibers may be solution dyed.
- **Stock** – dyeing of fibers in staple form.
- **Yarn** – dyed in yarn form before the fabric stage.



Post Dyed:

- **Continuous** – a process in which the fabric or greige goods pass through dyeing and subsequent operations without interruption.
- **Beck or piece** – a process in which separate pieces of fabric are handled sequentially through dyeing and subsequent processes.
- **Print** – application of the dye in a pattern applied through a screen or rollers. Nylon, cotton and wool can be print dyed.

Color Loss Concerns:

- **Bleeding** – migration of color in a liquid (especially around piping, seams and buttons) 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.

****Potential bleeders:

- **Jacquards**
- **Prints**
- **Contrasting welts**
- **Dark color decking (fugitive dyes)**
- **Needlepoint**
- **Tapestries**

Pretest every fabric. If testing shows possible bleeding use an acidic rinse, acidic foam or a dry solvent cleaning method. When in doubt turn down the piece. Always discuss cleaning risk with the customer.

Over wetting aggravates bleeding. Areas of possible over wetting include transition areas (where the tool is not flat) seams, buttons, piping and the crevice area.

- **Crocking** – the rubbing off 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.
- **Bleaching** – products such as household bleach (sodium hypochlorite), benzoyl peroxide (acne medication), fertilizers, glass cleaners. May remove primary color. An antichlor will neutralize the bleaching action. A reducing agent such as sodium bisulfate is an example of an antichlor.
- **Ozone fading** – loss of color usually blue.
- **Discoloration**- dye that has been altered or removed
- **Fading**- gradual loss of color due to sunlight

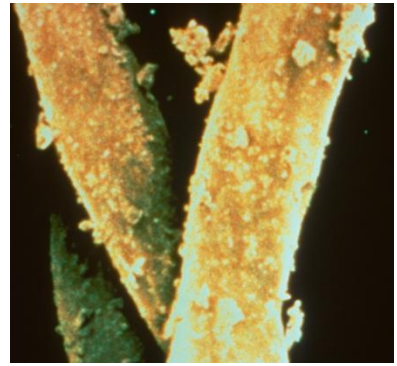
Dye terminology:

- **Pigment** – insoluble small particles used to dye fabrics. Referred to as solution dyes.
- **Dyes** – substances that add color to textiles.
- **Dye sites** – area within the fiber that provides sites for chemical bonding with the dye molecule.

Color Problems:

- **Metamerism** – variation of color under differing light sources. e.g. sunlight versus fluorescent or incandescent. Lighting and light fixtures can cause areas that look like spots.
- **Shading** – an apparent change in color when the pile is bent and the light reflects differently off the bent fibers. Acrylic velvets are prone to shading on the arms. This is hidden by soiling and should be thoroughly inspected and pointed out to the customer prior to cleaning.
- **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.

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, dust and other materials. 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 fabric. Large particles fall to the bottom while fine particles may be trapped in the abrasions and imperfections of the fibers.

Carpet suffers from the abrasion and tracking in of soils from the outside and contains more dry soil than fabric. Most fabrics are not walked on, but there are exceptions. The reason that fabrics, especially pile fabrics, have so much dry particulate soil is because fabric is rarely vacuumed. The cushions usually aren't rotated until a spill or stain occurs and only then the cushion is rotated. Water based spills are prevalent on carpet and fabric. Water rings will not come out with a dry solvent.

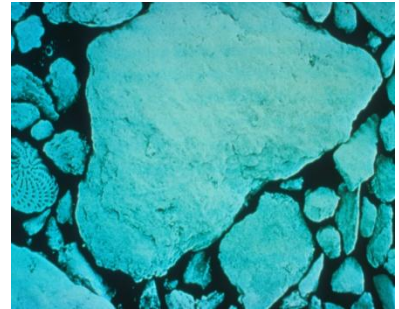
Fabric does contain more oily soils than carpet because of the intimacy of fabric versus carpet. Body oils and perspiration are attracted to the manmade fibers and acts as an adhesive for the dry soil. Throw in the animals that sleep on the furniture and a few urine problems and you have a mess.

Regardless of the fiber, weave, construction, or what type of fabric protector is applied soil will accumulate. Understanding the different types of soils encountered in fabrics helps you to understand the proper removal. Keeping the fabric clean will lengthen the life of the fabric.

Classes of soils*

Insoluble –

| | |
|-------------------------|---------------|
| sand, clay, quartz, | 45% |
| animal fibers, skin | 12% |
| cellulose, paper, grass | 12% |
| gypsum, apatite | 5% |
| limestone, dolomite | <u>5%</u> |
| | 74-79% |



Water Soluble -

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

Dry solvent soluble -

| | |
|--------------------------|-----------|
| fats, oils, rubber, tars | 6% |
| moisture | 3% |
| unknown | <u>2%</u> |
| | 100% |

* study performed by Hoover Vacuum Company 1953

Fabrics such as carpet, upholstered furniture and drapery filter soils, pollutants, gases, and animal dander. Like any filter they need to be cleaned.

Bacteria from the decomposition of body oils, perspiration, foods as well as fume fading can permanently damage or discolor fabrics. This cannot be fixed by cleaning. This should be noted and discussed with the customer during the initial preinspection.

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.

Review #4
Dyeing & Soiling

1. Red, _____ and _____ are primary colors.
2. Solution dyeing is achieved by adding _____ pigment before extrusion.
3. Any extruded fiber can be solution dyed but _____ must be.
4. A dye system that is applied in a pattern is called _____.
5. Bleeding is the _____ of color into an adjoining color.
6. Crocking requires _____ of the fabric.
7. To avoid color problems always _____ pretest the fabric.
8. Piping and _____ are areas easily over wet causing bleeding.
9. Dyes are _____ and pigments are _____.
10. Soil shading is caused by _____ of plastic fibers.
11. Benzoyl peroxide which may cause color loss is found in _____ medicine.
12. Soil is normally _____ on the pH scale.
13. The highest percentage of soil is _____.
14. Bacteria from decomposing body oils, perspiration and foods can cause _____ discolorations.
15. The best way to remove dry soil is by _____.

Principles of Cleaning

The objective of fabric cleaning is identifying, removing, and properly disposing of soil. Cleaning can be accomplished by several methods, but regardless of the method chosen, five principles must be followed to achieve the best results. The first:

Dry soil removal– use of a CRI Green Label vacuum with a high efficiency filter is recommended. Particles smaller than 7 um are not contained in low-efficiency bags.

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.

Prior to vacuuming if the fabric is matted or crushed especially on pile fabric a brush should be used to separate the yarns. This will improve the airflow and allow the vacuum to remove more soil.

Use a crevice tool to vacuum the crevice. Do not stick your hand in the crevice area.

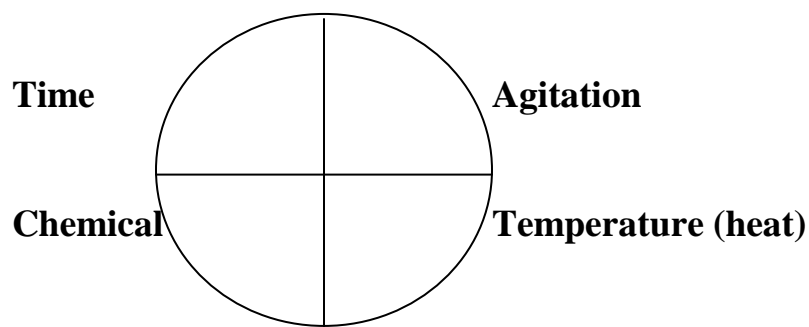
Empty the bag when it is 1/2 -2/3 full.

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

Pilling can be removed using electric shears or shavers.

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 known as TACT/CHAT.



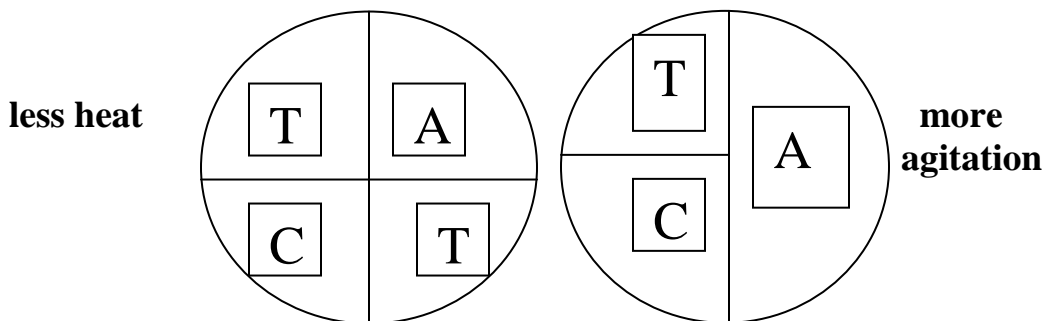
Time – soil that has accumulated over months or years cannot be suspended in a manner of seconds. The preconditioner must dwell for a period of time to be most effective. The longer the better, but it should not be allowed to dry. On non-colorfast fabric the dwell time should be limited.

Agitation – provides uniform distribution of the preconditioner or detergent. This may be accomplished manually with hand brushing, hand bonnet, natural sponges or mechanical agitation. The fiber, weave and finish determine the type of agitation used. **Be careful of loosely twisted or float yarns.** Always agitate parallel to the weak yarn.

Chemical – Detergents, builders and or selected solvents must be used to suspend, emulsify or saponify the various soils. Use products designed for fabric cleaning. For wool use a product that is safe 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. Excessive heat may cause damage to natural fibers such as linen, wool, silk and satin or velvet weaves.

When one part of the pie is **decreased** one or more of the others must be **increased**



In methods where heat is missing from the fundamentals one of the other components should be increased. Normally this is agitation. If the fabric can withstand it, increased dwell time is usually better than more chemical.

Soil Extraction

Once soils have been suspended they must be physically removed from the fabric. Various cleaning methods can accomplish extraction through

absorption, wet vacuuming, rinsing or vacuuming of dry detergent residues and suspended soils.

Increased temperature during extraction improves cleaning agent efficiency. Remember that if the fabric is a potential bleeder increased temperature will also increase the chance of bleeding.

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

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

Grooming

Grooming is a necessity for any type of pile fabric. A carding or velvet finishing brush must be used to eliminate matting and to leave the fabric in the best possible appearance. Pile fabrics need to be groomed immediately as completed and again after drying. Skipping grooming will cause the fabric to dry stiff and have the appearance of color loss due to textural changes.

Drying

The level of soiling, method of cleaning, humidity and airflow affect drying. The goal of every technician should be to have the fabric dry before they leave the job. The use of air movers can facilitate the drying. Airflow is necessary to achieve drying. The technician is responsible for any overwetting problems. According to the S-300 drying should occur in 6 hours.

Fabrics that dry slowly can develop odors. Biological growth is accelerated in moist warm (68-86°) conditions with poor airflow. Overwetting can accelerate bleeding; cause browning, and shrinkage in cellulosic fibers.

To achieve optimum drying run air movers parallel to the fabric as opposed to perpendicular. The rushing air will pull the moisture out of the fabric instead of pushing it back in.

Is your equipment working as efficiently as you are? Check out these items regularly: vacuum hoses, cuffs, T-jets, blower, fan vacuum, and the dump gate.

Normal versus restorative cleaning

Upholstered fabrics should be cleaned every **12-24** months by a trained technician using methods outlined in the *IICRC S-300 Standard and Reference Guide for Professional Upholstery Cleaning*. **This is dependent** on the use and soil exposure as well as the location of the upholstery and the customer's level of expectations. **This is considered normal cleaning.**

When upholstered fabrics have not been maintained they may need more aggressive, "restorative" or "salvage" cleaning to reach acceptable levels. These techniques may require a combination of methods and procedures that go beyond normal cleaning procedures. This will be based on the professional judgment of the technician after a thorough inspection of the piece. The findings, risk level and potential should be discussed with the customer and considered only with the customer accepting responsibility.

The age and condition of the fabric, its maintenance history, along with the type and amount of soil present and its effect on fibers and dyes, are critical in setting expectations for cleaning results. The fabric's condition may limit the level of cleanliness that can be achieved. An abused silk chair will not clean as well as an olefin sofa in the same condition.

Maintenance cleaning (vacuuming and spotting) should be done regularly by the consumer. This helps prevent premature wear.

Restorative/Salvage cleaning is required when soiling is severe and the customer has requested the furniture must be returned to a sanitary and improved condition.

No matter how careful and professional the technician performs, unforeseeable conditions could produce undesirable results. If a technician follows normal procedures and the customer understands the risks involved, technicians should not be held responsible for undesirable results.

Technicians must evaluate the soiling and furniture condition before beginning the cleaning process. It is highly recommended that their findings be listed in writing on a *Furniture Condition Report Form* and explained to the customer prior to obtaining a signature. Customers should have questionable upholstery cleaned strictly at their own risk.

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, dry solvent, 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. Choose the best method for the fabric after evaluation and testing. 94

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

Dry Solvent Cleaning is reserved for delicate or non-colorfast fabrics that can be damaged when using water-based cleaning methods. The term dry solvent refers to non-water, hydrocarbon-based compounds. Dry cleaning is considered to be the safest of cleaning methods but solvents may damage adhesives or latex back coatings. The good news is that dry cleaning solvents dissolve oily soils and **eliminate the fear of bleeding, shrinkage and browning**. The bad news is that it will have **little effect on heavily soiled fabric or fabric with water-based stains**.

A dry cleaning solvent may be toweled onto heavily soiled areas such as armrests to remove body oils or areas where hair oils have transferred to the headrest. A brush or hand bonnet may be used to agitate the soiled areas. Dwell time should be 5-10 minutes. If a solvent is to be heated it must be in a specially manufactured dry solvent compatible machine. Solvents are not to exceed **flash point** (temperature at which a vapor will ignite.) The extractor or a towel is used to extract the solvent and suspended soil. Blotting the piece with a towel after extraction may pick up additional suspended soil.

Following grooming drying must be expedited by using air movement and ventilation. Every effort should be made to leave the fabric as dry as possible before leaving the job site.

Safety tips for dry cleaning solvents

1. Ventilation must be provided prior to and during dry cleaning. Exhaust hoses should be vented to the outside and air movers used to exhaust fumes.
2. Standard immersion heaters may not be used to heat solvents.

3. No smoking around solvents.
4. Dry cleaning solvents should not be used around pilot lights, electric heaters or gas or fuel oil-fire heaters.
5. The cleaning unit should not be plugged into an electrical outlet closer than 10' to the fabric being cleaned. Always ensure proper grounding of electrical equipment.
6. Drop cloths must be used to protect floors. If solvent is sprayed onto finished wood, it must be wiped off immediately.
7. Technicians must wear government-approved, fit tested solvent (organic) vapor respirators with fresh cartridges which are approved for specific dry solvent vapors. If solvent odor is detected replace the cartridge. Splash goggles and dry solvent-resistant gloves must be worn. This is appropriate PPE for dry solvent cleaning.
8. Dry solvents must be stored in properly labeled, flame-resistant, manufacturer-approved containers.
9. Recovered dry solvents must be disposed in accordance with applicable government regulations.
10. Dry solvent vapors should not exceed Threshold Limit Values (TLV).
TLV is the air concentration of chemical substances workers can be exposed to for 8 hour-40 hour work weeks without harm.
TLV's are listed on the Material Safety Data Sheet MSDS.

Dry Foam – water soluble-soils are best cleaned by wet cleaning systems³⁸.

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.

This method can also be used with a bucket and a natural sponge. If the foam is on the acidic side it can be used as the safest method other than dry solvent cleaning. The foam can be toweled off or dry extracted with an extractor.

Shampoo

A preconditioner may or may not be used prior to shampooing. A high-foaming detergent is applied to the fabric using sprayers, sponges, or hand or mechanical brush action. The agitation of the brush creates the foam that suspends the soil. Fabric must be dampened uniformly, without overwetting

filling or padding materials. 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.

Hot Water Extraction (HWE) suspends and flushes the most soil

A preconditioner is normally applied through a pump sprayer, in-line sprayer or by preconditioning with the shampoo method. The suspended soil along with the preconditioner is flushed from the fabric with a HWE machine. Additional extraction passes; air movers and good ventilation will expedite drying. Over wetting or prolonged drying are normally due to operator error so preinspection is required before wet cleaning.

All extracted solutions must be disposed of according to local rules and regulations. Wastewater should be disposed of into an approved 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
 - slide in units (separate engine)
 - electric

The major difference between the portables and truckmounts in carpet cleaning is productivity. Many portables have direct water and waste hookups but most truck mounts can clean greater volumes of carpet due to greater heat, pressure and vacuum. In fabric cleaning the tremendous pressure, heat and vacuum is not required. Most trucks can adjust these variables for cleaning upholstery. Normally fabric requires lesser pressure. Technology in fabric cleaning tools has helped decrease the amount of overwetting claims. Be sure to look at the newer tools available for fabric.

Vacuum is measured in two ways:

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

Water pressure is measured in pounds per square inch (psi.)

HWE cleaning strokes: be sure to overlap to prevent streaking.

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. This stroke is used in heavily soiled areas. Use caution on velvet styles.

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. Check and replace any solution hoses that are worn to prevent a line rupture. You don't want to experience *Black Death*.
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 Safety Data Sheet (SDS) 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. They must be made available to anyone requesting the information.
7. Every spray bottle and container must be labeled with contents, manufacturer and dilution ratio.

8. Carry and use goggles, gloves and respirators as necessary. When in doubt wear them. PPE should be chosen at each site for individual technicians.
9. Use the proper gauge electrical cords with grounds and use grounded wall outlets.
10. Drive safely and cautiously.
11. When mixing chemicals wear PPE and only mix them in your facility or in your van. Never mix chemicals in your customer's home.
12. Purchase chemicals from a reputable source and never mix chemicals other than by label directions.
13. Never leave chemical samples in unlabeled bottles for your customer.

OSHA

Hazard Communication Law

CFR 1910.1200 "Right to Know"

- Requires Manufacturers to assess the hazards of chemicals.
- Requires employers to train their employees before they work with a hazardous chemical by means of a Hazard Communication Program.
- Requires documented safety meetings.

The training must explain the Hazard Communication Standard & how you are implementing it. **A mandatory sign "Job safety & health protection" must be posted in the work place.**

- OSHA requires that proper first aid for workplace accidents is readily available. Eyewashes, chemical resistant gloves, antibacterial treatments and bandages are a necessity. A first aid kit should be on the van also.
- According to OSHA slips, trips and falls account for over 15% of all accidental deaths. **Always use WET FLOOR signs.**
- Other OSHA Regulations
 - **1910.134 Respiratory Protection**
 - **1910.1030 Bloodborne Pathogens**
 - **1910.132 Personal Protective Equipment (PPE) For additional information enroll in the IICRC Health & Safety Class.**

Review #5
Principles & Methods

1. *The principle of _____ is frequently skipped.*
2. *The second principle is _____ suspension.*
3. *The cleaning pie consists of T_____ A_____ C_____ T_____.*
4. *Soil extraction may include absorption, _____ & _____.*
5. *Natural fiber velvets should be groomed _____ following cleaning.*
6. *Air movers should be placed _____ to the fabric rather than _____.*
7. *According to the S300 fabric cleaning should be performed every _____ - _____ months*
8. *Dry solvent cleaning will only achieve moderate results on _____ soiled fabric or on _____ based soiling.*
9. *Flash point refers to the _____ at which a vapor will ignite.*
10. *For maximum soil removal and flushing use _____.*
11. *Choose appropriate P_____ P_____ E_____ at the job site.*
12. *An _____ dry foam is a good replacement for dry solvents.*
13. *Fabric cleaning is best done using lower _____.*
14. *All chemicals must have a _____ in the truck.*
15. *To be safe use an _____ and leave the fabric _____.*

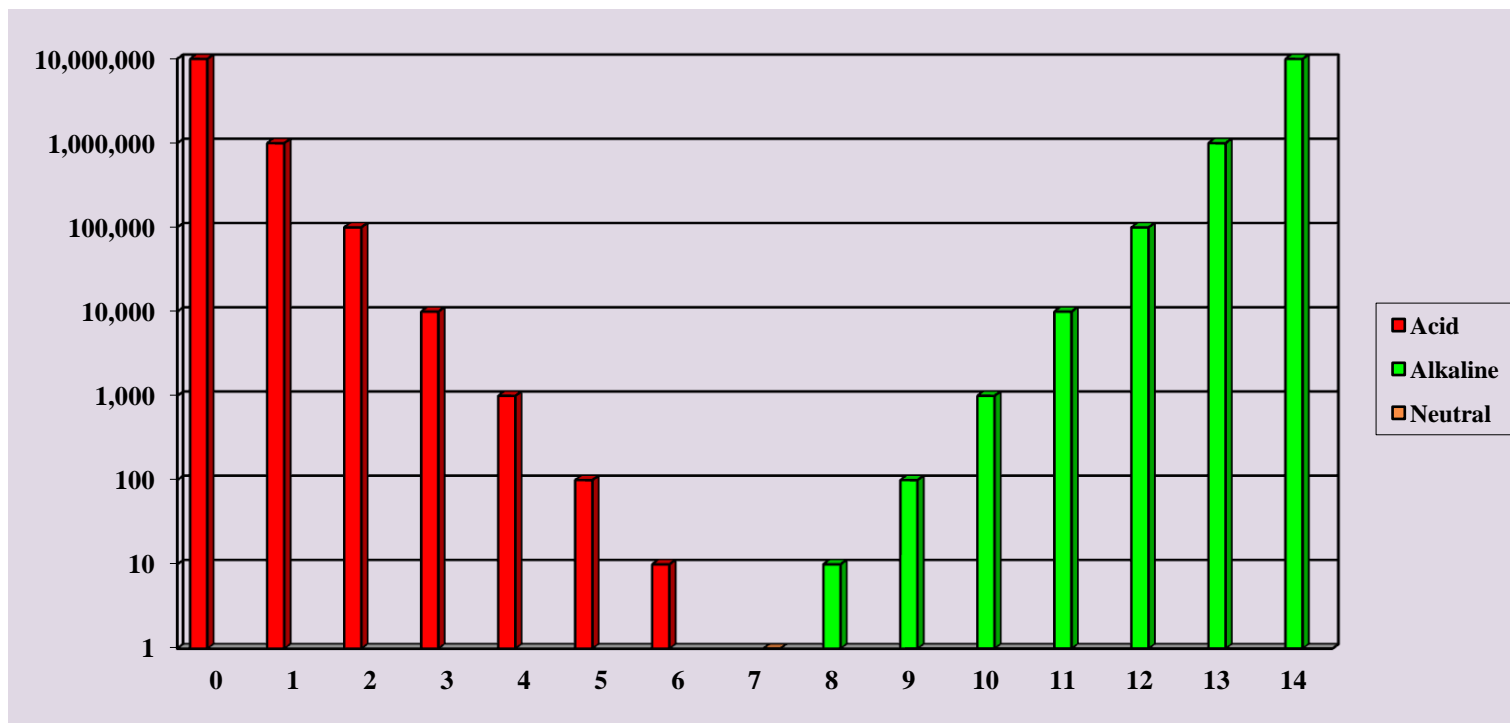
Chemistry

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.



Atom - (H) is an individual component of a molecule (H₂O).

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**.

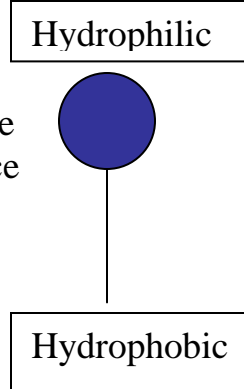
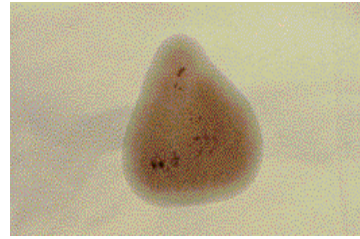
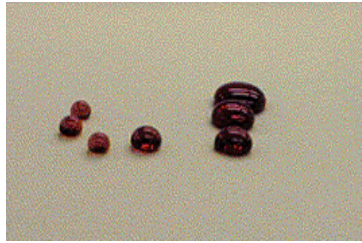
Surfactant – (surface-active agent) chemical that when added to a liquid, changes the properties of that liquid at the surface. It allows penetration into the material being cleaned. It makes the water wetter. Surfactants are classified as **anionic (negative)**, **nonionic (no charge)**, **cationic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

Builders – a material that enhances or maintains 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. This chemistry comes in handy in greasy restaurants.

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

Water is used in most 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 sudsing qualities.

Unfortunately these shampoos also left a sticky residue behind which caused rapid resoiling. Soaps do not work well in hard water and form a curd damaging the effectiveness of cleaning.

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

A properly formulated detergent has several ingredients:

Surfactants - help penetrate, reduce the surface tension and wet out the fabric.

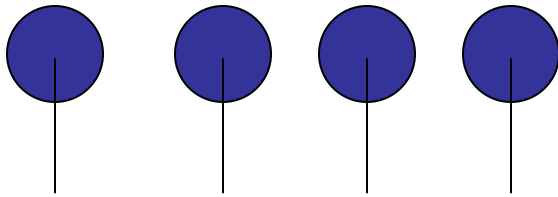
Builders - provide alkalinity, soften the water and prevent redeposition of the soil once it has been suspended. Soft water allows the use of less detergent.

Solvents – designed to emulsify oils.

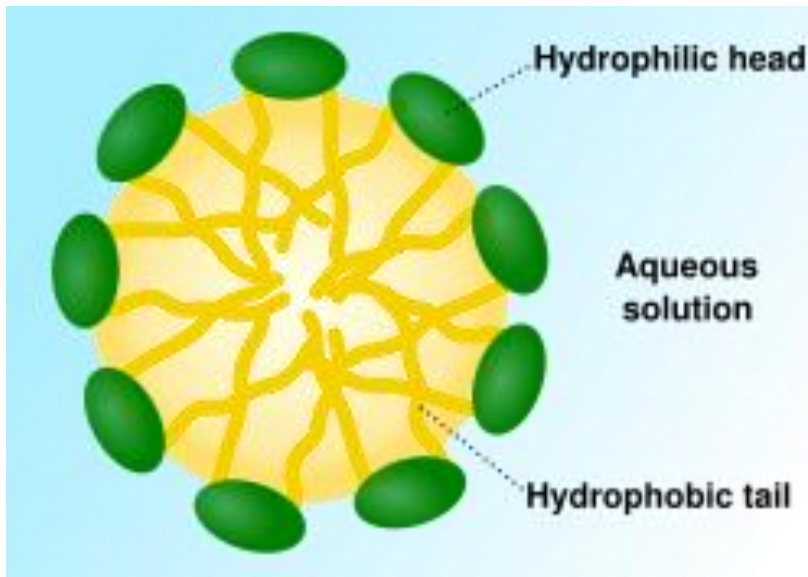
Deodorizer – because people believe if it smells clean it is clean.

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 happens during the preconditioning or soil suspension step. Agitation during this step speeds up the process and a heated solution will help to dissolve body oils on the fabric.

Hydrophilic



Hydrophobic



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 which 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. Adding a _____ surfactant to a cationic _____ will not change the charge.***
- 15. Adding a scented deodorizer leaves a pleasant _____ but does not neutralize the odor. It dissipates as it dries.***

Chemicals required for cleaning

Chemistry used for fabric cleaning differs slightly from that used for carpet cleaning. Nearly all the carpet we clean is made of synthetic fibers and we are safe cleaning any of it as long as the pH is less than 10. Carpet is a much thicker material and we need products that can penetrate to the primary backing in order to flush the soil. Solvents aren't as likely to cause delamination in a thick carpet. Because of stain resist treatments in carpet we have to be cautious about the use of any cationic products such as strong deodorizers and sanitizers.

At least half of the fabric we clean will be made of natural fibers and the pH needs to be adjusted downward to compensate. High alkalinity can cause bleeding and accelerate browning. The fabric we clean may be as thin as the shirt you are wearing and we don't want chemicals that will over wet the fabric. Fabrics do not contain stain resist treatments like carpet so there is no rule against using cationic products on fabric. Finally as a rule of thumb if we leave the fabric in an acid state the chances of bleeding and browning will be minimized. Most fabric following a thorough preinspection can be safely wet cleaned using the proper chemistry.

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.
- Heavy duty – used on restaurants and heavily soiled synthetic fabrics. Normally the pH is above 10 and may include enzymes.
- Heavy co-solvent based products that have a neutral pH but can still go after the tough jobs without the high alkalinity.
- Neutral to acidic – mild products used on wool, cotton and any non-colorfast fabrics
- Dry cleaning solvent - water free for the fabrics that can't be wet cleaned.

2. Rinse detergents – added into cleaning solution.

- Alkaline – used on any synthetic pH 8-10
 - Used when fabric is more than moderately soiled.

- Can be used on wool if it is approved for use on wool.
- Can accelerate browning on cellulosic materials.
- **Acid Rinse** – used in place of an alkaline detergent when fabric is light to moderately soiled. pH 2-4
 - 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.
 - Prevents browning, bleeding.
 - Leaves fabric softer.
- 3. **Shampoos**
 - Alkaline based for synthetics pH 8-10
 - Acid dry foam pH 5-7 (safest pH for all fabrics)
 - Good replacement for dry solvent cleaning

In most residential fabrics a quality preconditioner and rinse detergent or acid rinse will remove 90-95% of soil and spots.

Remember that most cleaning is being accomplished with two products; your 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. Mixing incompatible chemicals or improper application and removal can cause resoiling. Effective chemicals make the job easier and will result in happier customers. That means repeat business.

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.

The main deodorizing request for fabrics is for removal of a urine odor. The problem is urine has penetrated the cushion. In order to remediate the odor the source must be removed. The ideal solution is to replace the foam insert and clean and deodorize the fabric. If that can't be done use an injector needle to insert deodorizer into multiple areas of both sides cushion. Place the cushion in a plastic trash bag, unzip the cover and place a vacuum hose directly on the foam cushion and shrink the cushion. This allows the deodorizer to permeate the entire cushion. Then clean and deodorize the rest of the cushion. Remember if it is a dry cleaning only fabric, it is best to use a solvent based deodorizer.

Fabric softeners are designed to soften fine fabrics especially natural velvets. It can also deodorize and neutralize foul odors.

Soil & Stain Protectors

- **Soil retardants** – filled in crevices of the fibers with colorless particles to prevent soil from attaching. Used very little today.
- **Silicones** – great water repellency but not very effective on oil or dry soil. Many silicones cause rapid resoiling.
- **Fluorochemical** – known under trade names 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.
 - Fabric should be residue free.
 - Over application can cause textural stiffness

Defoamers – products designed to eliminate foaming problems in hoses and extractors. They are available in powder or liquid form. 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.

Sprayer options for applying chemicals:

Pump sprayers come in a variety of sizes and materials. Most are relatively inexpensive and easy to use. The downside is the tendency for the tips to clog and drip or spray unevenly. If the sprayers are not emptied daily they can malfunction. Inline sprayers have the benefit of consistent pressure and the benefit of being diluted with hot water.

Chemical dilutions: dissolve powders in hot water and stir

1 gallon = 128 oz.

1 quart = 32 oz.

1 pint = 16 oz.

1 cup = 8 oz.

When the label dilution reads 1:4 that means 1 part chemical to 4 parts water. ($128 \div 4 = 32$) 1:4 means add 32 oz. chemical to 1-gallon water.

1:8 1 part chemical to 8 parts water ($128 \div 8 = 16$) add 16 oz chemical to 1-gallon water. 1:1 means 1 part chemical to 1 part water.

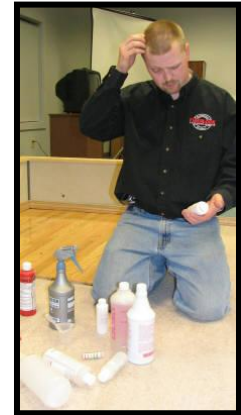
Last but not least when mixing detergents **Follow Label Directions.**

Spotting for the professional

Once the fabric has been preconditioned and rinsed a few spots may remain. In many cases while 95% of the piece 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 fabric. Unfortunately the same differences in cleaning carpet versus fabric pop up again.

Natural fibers fabrics do not release stains like synthetics. The latex backing on fabrics make the use of solvents risky. The thickness of the fabric makes it difficult to avoid overwetting. The foam cushions act like big wicking sponges. A word of caution, a few stains may not be removed. Even worse you may get too aggressive and damage the fabric. Remember you didn't cause the spot so don't let your ego get the best of you.



Definitions:

- Spot – substance added
 - Gum, tar, food, ink
- Stain – unwanted color added can't remove by normal cleaning
 - 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 cotton versus olefin. Solvents are much riskier on latex backed fabrics.

- Ask the customer
- Location – vanity stool vs. dining room chair
- Use your senses
 - Sight
 - Smell
 - Touch
 - Taste

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 fabric latex backing. The Threshold Limit Values (TLV) of any solvent which is the amount a person can be exposed to in 8 hours.

- **VDS** - Volatile Dry Solvent (evaporates) solvents are used for spotting, not total cleaning. This includes chlorinated solvents.
- **NVDS/POG** - Nonvolatile Dry Solvent –also referred to as Paint Oil Grease remover – leaves a residue that needs to be rinsed with water or some products require a VDS. Read the labels to know what to use as a rinse. Use tamping brush.
- Provides more dwell time than a volatile solvent.
- **Citrus gels** - same as POG except in a gel form which helps to prevent delamination of latex backing.

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
- **Enzyme/digester** is 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. Old 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 before total cleaning Hydrofluoric acid can damage fabric and is hazardous to technicians.
- **Dye stains** can be removed by oxidizers/reducers.

Oxidizers – color removal by adding oxygen.

Oxidizers are bleaching agents. Before you think that you are going to damage the fabric, you need to understand the different types of bleaches. The sun is a very large oxidizing agent. Ozone that is 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. **A reducer can stop an oxidation reaction.**
- Sodium perborate/percarbonate is a common ingredient in many boosters or energizers used in our industry.
- Hydrogen peroxide 3% 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 percentage hydrogen peroxide used for hair bleaching may also bleach the fabric.
- Oxidizers can be accelerated by heat and light.
- A color made invisible by oxidizers is permanent.
- Oxidizers help remove nicotine discoloration from fabric.

Reducers/strippers perform a similar function (**color removal**) to oxidizers by **removing** oxygen from the stain. They are accelerated by heat and acid.

- Reducers are not as permanent as oxidizers because the stain may absorb oxygen-containing moisture.
- Reducers are commonly found in coffee stain removers 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 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.

Tools required:

pH paper

bone spatula

tamping brush

napping shears

white towels

eye droppers or Q-tips

bottles with drip

spouts

trigger spray bottle

inspection & black light

PPE (gloves, goggles, respirator)

Small dropcloth

Fiberglass screen (for weakened fabric on arms)



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.**
4. **Use a measuring cup.** (*that's the small plastic cup with red lines*)
 - Remove the excess – blot, scrape, absorb, vacuum.
 - 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 the residue and contaminants.
 - If the fabric has a pile, groom the pile.
 - If you believe the spot may wick place absorbent paper toweling on the spot and place a heavy weight on it. Inform the customer to remove the toweling in 12 –24 hours. If the spot returns it is either you still have spotting residue or the spotting agent was not thoroughly flushed.

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 fabric** you probably have color loss and the fabric 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. Inform the customer before continuing. A UV light may help to locate a urine stain.
- Mixing ammonia and chlorine bleach creates a poisonous gas.

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

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 (follow the manufacturer's instructions.) 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. Be careful where you set the bottle.

Red dye (*while these products work on carpet they are risky on fabric*)

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 fabric is not transferring to the towel it is safe to continue. **Any heat transfer methods are risky on fabric.**

Mustard

Removing organic dyes such as mustard and furniture stain requires a reducing agent. Mustard contains turmeric giving it the yellow color. Mustard stains are very difficult to remove. For severe stains the chemical may need to be covered in plastic and allowed to dwell for 8-24 hours. Use of an ultraviolet light may accelerate the color removal.

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

BP 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.

Copier Toner

A fine pigment that is insoluble. It is critical to vacuum as much of the toner as possible before attempting to use a chemical. A VDS should be applied to lubricate and suspend the remaining pigments. Rinse and extract.

Ink

Ink may be water soluble, solvent soluble, or insoluble. Always start with a VDS and avoid spreading the spot. Be careful of delamination on latex backings.

Wax

May be removed by placing a wet towel over the wax and placing an iron on the spot. Be cautious on olefin fabrics.

Grease, Tar, Oily substances

Use a VDS, tamp the area, and then use an absorbent towel.⁶⁸ If older oils have oxidized or been absorbed a stronger chemistry and additional dwell time may be necessary. Be careful using solvents on latex-backed fabric.

Spotting Chart

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

Remember to pretest your spotters and follow directions.

Experiment at home not in your customer's home.

Use only enough spotters to suspend the spot.

Coffee is a very difficult problem. Coffee has a natural vegetable dye (tannin). When it is spilled hot it penetrates and dyes quickly. Decaffeinated coffee has additional dyes added to make the color darker. Cream and sugar complicate the spot by adding protein. Tannin removers or specialized coffee removers containing reducing agents are the best choices. Sugary residues may cause rapid resoiling. Thorough rinsing is required.

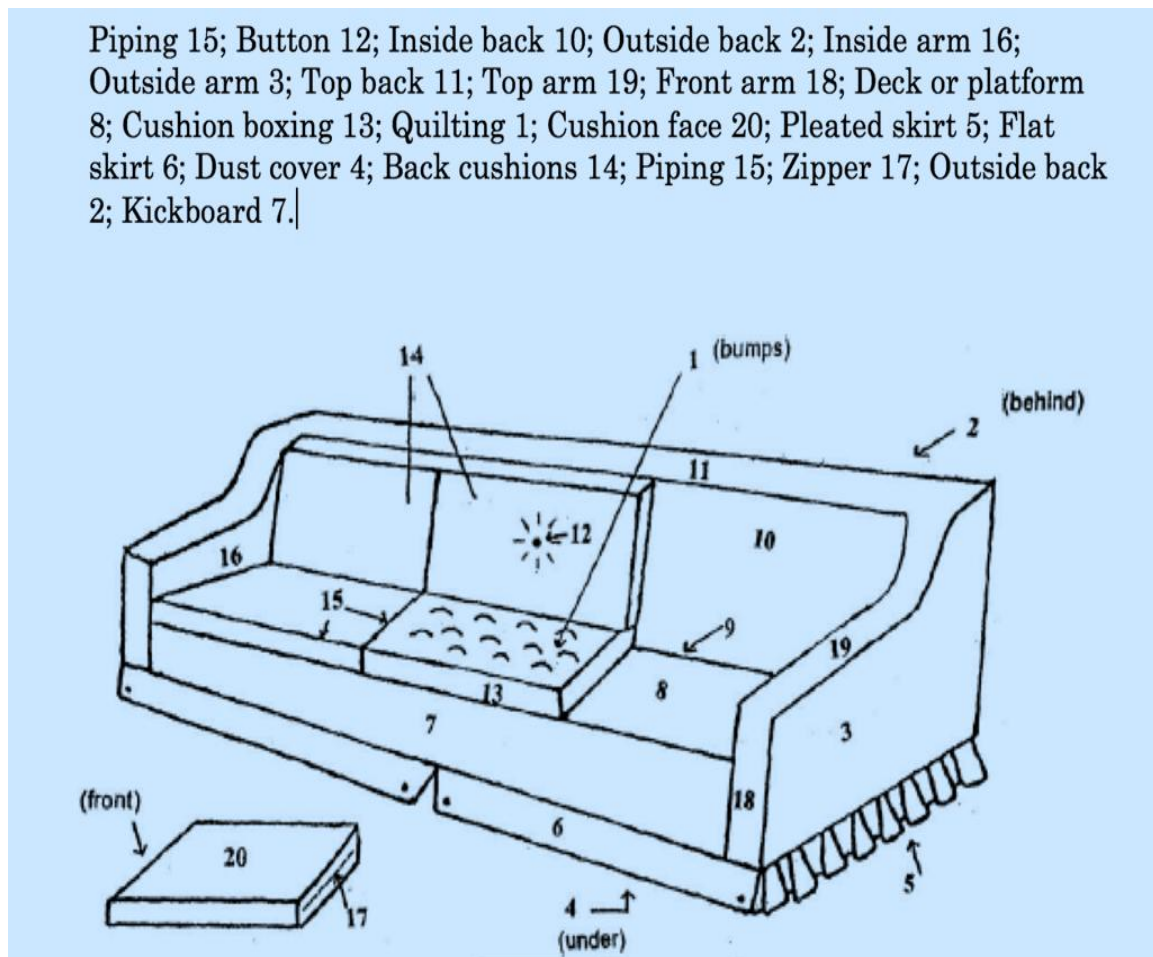
Review #7
Chemicals & Spotting

1. *The workhorse of cleaning products is the _____.*
2. *An _____ detergent is used on soiled synthetic fabrics.*
3. *An _____ is the best choice for neutralizing a preconditioner.*
4. *For all fabrics the safest pH to use is between ____-____.*
5. *A _____ repels all three types of soils.*
6. *A gallon contains _____ ounces.*
7. *A spot adds _____ to the fabric, a stain adds _____.*
8. *Asking the customer, noting the _____, and using your _____ helps to identify the spot.*
9. *An _____ 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 be sure to _____ 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.*

Inspection

In order to properly inspect a piece of upholstered furniture we need to use the correct terminology. Using the proper vocabulary in discussing the piece with the customer allows us to demonstrate our professionalism.

Piping 15; Button 12; Inside back 10; Outside back 2; Inside arm 16; Outside arm 3; Top back 11; Top arm 19; Front arm 18; Deck or platform 8; Cushion boxing 13; Quilting 1; Cushion face 20; Pleated skirt 5; Flat skirt 6; Dust cover 4; Back cushions 14; Piping 15; Zipper 17; Outside back 2; Kickboard 7.



Most problems can be prevented by a thorough preinspection, testing, communication and documentation of any concerns to the customer. Try to involve the customer in your inspection. They normally feel better and are more likely to accept areas that did not respond as well as they had hoped. This inspection should include a burn test and colorfastness test. Before you do anything such as burn tests, moving the furniture, etc. ask the customers permission and inspect for preexisting damage.

Inspection Procedures

Burn test using a pair of napping shears cut a small sample from inside the zipper or under the skirt of the fabric. Hold the sample in a tweezers over an ashtray and burn it with a butane lighter. To identify the fabric note the flame, the smoke and residue. This is not conclusive because so many blends are used. If you have predominately ash most likely it is a natural fiber. A hard bead is normally synthetic. If the bead smudges it is probably a blend.

Colorfastness test – clamp a white towel on an inconspicuous area that has been dampened with the highest pH chemical that you may use. Ideally give the towel time to dry before you check it. Tests are not conclusive until dry. If there has been no color transfer it should be safe to use. If there is a color transfer use a milder chemical or a dry cleaning solvent.

Once you have performed these two tests you should have the information needed to choose a cleaning method.

Furniture manufacturers use an ASTM labeling system for colorfastness codes to assist consumers in determining colorfastness to spotting or cleaning agents. **Content label refers to filling materials only.**

S, W, SW, X

S – Dyes are stable to dry solvent-based spotters/cleaners.

W – Dyes are stable to water-based spotters/cleaners.

W-S - Dyes are stable to either water or solvent-based spotters/cleaners.

X – Dyes are not stable to either water or solvent-based spotters/cleaners.

These labels are not cleaning codes. All they prove is that distilled water did not cause any problems. While these labels may be helpful, in many cases they are wrong. Ultimately the tech should rely on his testing and previous experience.

Inspection Questions to the consumer

1. **How old is the fabric** – many older velvets were natural fibers. Older fabrics may have been weakened. Dyes may have become unstable. Fading cannot be repaired. Buttons may be metal and can cause rust.
2. **Has the fabric been cleaned before** –by a professional gives you an idea that it is cleanable but there may be residue that will cause problems. If the consumer has cleaned it you **know** there is residue.
3. **Has the consumer ever placed the cushion covers in the washing machine** –if yes the zippers may be broken, the fabric may be weakened and there may be brighteners on the fabric. The zippers are for ease of positioning the cushion inside never for cleaning.
4. **Any particular areas of concern** – if there are hidden problems now is the best time to find out. Look for preexisting conditions.

Inspection steps (an inspection and black light is handy)

1. **Always start in the same place for consistency** - back, right arm, inside back, cushions, left arm, deck, dust skirt.
2. **Unzip cushions carefully** – inspect the zipper before pulling, look at condition of cushion, is the foam crumbling? Look for ink marks or water rings.
3. **Check stability of legs** – use skidders to carefully move the piece.
4. **Check stability of polished cotton glaze** – use a water drop on back skirt as compared to cushion.
5. **Use a 30X microscope on weaves that have abrasion damage.**
6. **Check for holes tears, rips, stains and color loss.**

If you discover any concerns discuss them with the customer and have them sign a release or invoice listing the concerns. If you do not feel confident of your expertise on a fabric either turn down the job or turn it over to someone in your company with more experience.

Do not let your ego or the customer's insistence pressure you into cleaning a risky piece of fabric.

Just because a fabric is expensive doesn't mean it will not bleed, shrink or brown. Normally the more expensive the more risk. Always do your test. Don't guess if even if you feel confident there is no problem.

Ask yourself – How will this piece look in my living room if I ruin it?

Cleaning Procedures

Following the inspection and discussion with the customer you are ready for the cleaning process.

First set up your cleaning area (normally if you are cleaning carpet and upholstery it is best to clean the upholstery first). Use moisture absorbent furniture pads large enough to provide a 2-foot perimeter around the piece. Move the piece away from walls and any other furniture.

Slowly and thoroughly vacuum the piece. If the fabric has pile (velvet, chenille, corduroy) brush against the grain before vacuuming.

Mist the deck evenly and extract. Precondition the fabric with a chemical that has proven safe on the fabric. Do not spray the whole piece unless it is small enough that the prespray does not dry before extraction. **Do not clean cushions on deck.** Clean them on drop cloth or work table.

Agitate with a brush, sponge, bonnet or towel. Be sure to agitate in the direction of any float yarns. Do not agitate in both directions on velvets.

Allow sufficient dwell time and then extract. Use a neutralizing formula (acid rinse) either as the rinse or as a post treatment.

Towel the whole piece. This helps to remove wicking soil and excess moisture. Place the cushions on colorfast paper or material. Arrange them in an inverted V with a Styrofoam block in between the cushions. Set up an air mover parallel to the cushions and one at an angle to the piece.

If the fabric is natural velvet use a carding brush after each piece. Brush in all four directions with the final carding laying down the pile. Set up air movers. If the piece is synthetic the carding may be done as the last step.

When finished place the cushions on colorfast paper.

Apply a protector as the final step.

Be sure to advise the customer that the cushions should not be replaced on the sofa until the following day. Replacing the cushions too soon may cause bleeding.

Problem Fabrics

| Fabric | Concern | Procedures |
|--|--|--|
| Haitian Cotton Any cellulosic | Browning/shrinkage Weak, low twist yarns Browning/shrinkage | Use a Haitian Cotton formula Agitate with filling yarn Use reducing prespray, acid rinse, speed dry |
| Natural fiber velvet | Texture distortion | Heavy prevac, moderate pH prespray Card each piece immediately, continue fluffing until dry |
| Jacquard fabric | Bleeding | Be sure to pretest chemicals for colorfastness. Moderate pH prespray, acid rinse, speed dry |
| Polished cotton/chintz | Loss of sheen/polish | Pretest with water drop on back skirt, compare to worn areas. Clean normally. |
| Silk | Color loss Texture loss | Pretest for color fastness, Use neutral to acidic prespray. No agitation. Moderate heat only. Wet evenly to avoid rings. Speed dry. |

Partitions, Workstations & Walls



These materials are mostly synthetic and can be successfully wet cleaned. These fabrics act as filters and normally have a high percentage of dry soil. Brushing and prevacuuming can make a dramatic improvement.

In most building these materials are seldom if ever cleaned. Demonstrate how soiled they are by placing a thin white towel over a vacuum hose and vacuuming a small area. The towel will have a solid black circle when you are finished.

Partition fabrics are the source of many air quality issues.

Remember this saying “**A presentation without a demonstration is just a conversation.**”

Upholstery equipment & chemicals list

| <u>Equipment</u> | <u>Chemicals</u> |
|-----------------------------------|---------------------------------------|
| extractor preferably with heat | presprays – high pH, neutral, acidic |
| dry cleaning machine | solvent detergent |
| 2-3 upholstery tools | detergents - high pH, neutral, acidic |
| small vacuum | acid rinse |
| buckets | shampoo |
| immersion heater | dry foam - acidic |
| 2 furniture pads | Haitian cotton formula |
| nylon bristled brush | browning formula |
| horsehair brush | spotting kit including VDS, NVDS, |
| carding brush | ADS, AS, NDS, Rust Remover, |
| tamping brush | Enzyme, Oxidizer, Reducer, |
| finishing brush (soft) | pH paper, bone spatula, eye droppers |
| sea sponge | deodorizer – water/ solvent based |
| bonnet mitt | |
| spray bottles | |
| pressure sprayer | |
| 2 small air movers | |
| 6 plug adapters | |
| 24 clean white washed towels | |
| lint roller | |
| measuring cup | |
| pilling shaver | |
| PPE - respirator, goggles, gloves | |
| SDS | |
| work table | |
| furniture tabs | |
| heavy duty stapler | |
| fiberglass screen | |

Problems and 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. The only way to have true cellulosic browning is to have cellulosic materials involved. 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 fabric. Rinsing with an acid rinse can prevent browning. Haitian cotton is minimally processed and seeds aggravate the browning. Using low-moisture methods can help to prevent browning.

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 from 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 fabrics. 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.

Yellowing – on fabric is usually caused by oily soils sticking to synthetic fabrics especially polyester and olefin. This can create bacteria which can cause damage to the fabric.

- Silk can yellow with age.

Soil Filtration

- 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. While not as prevalent on upholstered furniture it may occur when a chair is placed near a return air duct. Removal will 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 fabric 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 fabric caused by:
 - Improper wand stroking
 - Blockage of vacuum slot or T-jets
 - Wicking
 - Improper preconditioning (clogged sprayer tip)

Fabric deterioration

- This is a major concern with fabrics. A chair or sofa sitting next to a window may receive several hours of sun every day which weakens the fiber especially olefin. Soiling, oxidation and time aggravate the situation. Check the arms with a 30X microscope to identify any weakened fibers or weaves. If the fabric on the arms has weakened use a synthetic screening material to clean through.

Shrinkage

- Cellulosic materials can easily shrink. The yarns will swell as they absorb moisture and cause the crossing yarns to contract. If shrinkage is a concern use a low moisture method and speed dry.

Ink marks

- This problem is specific to fabrics. Many of the cushions or fabrics are marked with ink markers as identification during manufacturing. You should discover this during your preinspection. Place a small piece of plastic over the ink marks while cleaning and allow it to remain until it is completely dry.

Texture distortion

- Natural velvets as previously discussed must be handled carefully or the small denier fibers will mat together. This causes texture distortion and the appearance of color loss. The color has not changed but is reflecting light off the matted texture that refracts a different color. This can be corrected by using a hand steamer and a carding brush. Slowly fluff the fiber back and forth until the softness has returned. Be patient.

Rust

- Older furniture may have metal buttons that can rust. Try a mild acid before going to a rust remover.

Waste Water removal

- Dumping of waste water must be in accordance with any city, state, or federal regulations. In most states this means the water must be dumped into a sanitary sewer system. Solvents as used in dry cleaning must be filtered and handled separately by regulations covering solvents and dumped into an approved disposal site.

Bleach & Ammonia

- These two ingredients mixed together will create a poisonous gas and can kill you.

Excessive soiling

- Heavy soiling may be permanently stained or yellowed.

Review #8
Preinspection & Problems

1. A thorough _____ and _____ with the customer will prevent many problems.
2. When inspecting the inside of a cushion look for _____ marks and for deterioration of the _____.
3. Colorfastness tests are not conclusive until the fabric is _____.
4. An S code on fabric usually recommends _____ cleaning.
5. The tag found on the deck of the sofa listing fibers refers to the material _____ the sofa, not fabric on the sofa.
6. First step for cleaning is to place an _____ under the piece to be cleaned.
7. Due to water rings developing it is best to _____ the decking material prior to cleaning the piece.
8. When arranging the cushions for optimal drying it is best to place them on an _____ material. Do not place on the _____.
9. Jacquard fabrics are prone to _____.
10. Look for a loss of _____ on a polished cotton fabric.
11. Office partitions are easy to clean due to the _____ fabric.
12. Browning is caused by _____, slow _____, and cellulose.
13. Shrinkage is caused by the _____ of yarns.
14. Velvet weaves can easily _____ and must be _____ immediately.
15. A presentation without a _____ is just a _____.

Final comments

Few carpet cleaners clean fabrics due to the horror stories and a lack of training. Actually there is more fabric available to clean than carpet. Due to the smaller numbers of cleaners who actually market fabric cleaning the prices for fabric cleaning are better.

Now that you have completed the schooling part you now can begin to accumulate the knowledge that can only be attained in the field. Keep these very important steps in mind to prevent problems.

- 1. Inspect and test every piece**
- 2. Communicate the findings to the customer.**
- 3. Set their expectations at a level you can achieve or beat.**
- 4. Follow the principles and choose the method safest for the fabric. Remember your responsibility is to clean the fabric to the best of your ability without affecting the color or texture.**
- 5. Leave the fabric on the acid side by using an acid rinse or prespray to stabilize the dyes.**
- 6. Get it dry by using good techniques and air movers.**
- 7. Now go out and make some money. Good luck.**

Review #1

Natural Fibers

- 1. Clean fabric as well as you can without affecting the color or texture.*
- 2. Natural fiber fabrics are very absorbent.*
- 3. Cotton, linen, and hemp are examples of cellulosic fibers.*
- 4. Wool and silk are examples of protein fibers.*
- 5. Natural fiber fabrics can shrink, brown, or bleed.*
- 6. Wool should be cleaned with chemicals approved for wool.*
- 7. The epidermis of a wool fiber can be damaged by alkalinity.*
- 8. Bleach can dissolve a wool or silk fiber.*
- 9. Silk is obtained from the cocoon of a silk worm.*
- 10. Silk spots easily and should be cleaned with a neutral pH.*
- 11. Cotton comes from a seed and linen comes from the stalk of a plant.*
- 12. The binder holding cells together in cellulose is called lignin.*
- 13. Cotton goes through mercerization to strengthen and add luster.*
- 14. When the cotton is harvested it goes through ginning to remove the seeds. It also is combed & carded to remove dirt & twigs.*
- 15. Rayon is weakened when wet and should be cleaned similar to cotton.*

Review #2

Synthetic Fibers

- 1. Synthetic fibers are created through a process called extrusion.*
- 2. Synthetic fibers can be either filament or cut into staple.*
- 3. Nylon dyes easily which means it stains easily.*
- 4. Olefin fabrics can be damaged by friction and sunlight.*
- 5. Olefin and polyester are attracted to oily soil, this is referred to as being oliophilic.*
- 6. Polyester is frequently blended with cotton fibers.*
- 7. Oily soils not removed from polyester fabrics can cause yellowing.*
- 8. Polyester fibers are being made using recycled plastic bottles.*
- 9. Acrylic fabrics can be damaged by excessive heat.*
- 10. Acrylic is frequently used in a velvet weave.*
- 11. Microfibers are the finest fiber, with denier of less than 1.0.*
- 12. Microfibers usually are polyester.*
- 13. When doing a burn test if the residue turns to ash you have a natural fiber. If it melts it is a synthetic fiber.*
- 14. The fiber that floats is olefin, if it is dissolved by formic acid it is a nylon fiber. If it is an ash and smells like paper it is cotton.*
- 15. Burn tests are not necessarily conclusive but should always be done.*

Review #3

Yarns & Fabrics

1. *Fibers are blended, carded, spun and plied creating fabric.*
2. *A twill weave is identified by _____ lines.*
3. *Woven fabric is created on a loom. Lengthwise yarns are called warp and crossing yarns are called weft or filling.*
4. *The most basic weave is called plain and is the strongest.*
5. *A satin weave is delicate and is identified by the floating yarns.*
6. *Caution should be used on a satin weave so as not to snag a yarn.*
7. *Jacquard weaves are identified by looking at the back of the fabric and can easily bleed with high pH and overwetting.*
8. *Pile weaves include velvet and chenille. This weave holds more soil than other weaves.*
9. *Chenille is considered a pile weave.*
10. *Tufted fabrics must have latex to hold the yarns in and can be damaged by excessive use of solvents.*
11. *Flocked velvet fabrics are created by gluing nylon tow to the base cloth. This fabric can be damaged by solvents.*
12. *Quilted fabrics have at least 3 layers and can be easily overwet.*
13. *A moiré fabric has an embossed watermark and can be removed during HWE.*
14. *Polished cotton has a sheen that is removed over time and through abrasion. Test this fabric with a drop of water on a newer piece.*
15. *Another name for polished cotton is chintz.*

Review #4
Dyeing & Soiling

- 1. Red, blue and yellow are primary colors.**
- 2. Solution dyeing is achieved by adding colored pigment before extrusion.**
- 3. Any extruded fiber can be solution dyed but olefin must be.**
- 4. A dye system that is applied in a pattern is called print.**
- 5. Bleeding is the migration of color into an adjoining color.**
- 6. Crocking requires agitation of the fabric.**
- 7. To avoid color problems always colorfast pretest the fabric.**
- 8. Piping and cushions are areas easily over wet causing bleeding.**
- 9. Dyes are soluble and pigments are insoluble.**
- 10. Soil shading is caused by abrasion of plastic fibers.**
- 11. Benzoyl peroxide which may cause color loss is found in acne medicine.**
- 12. Soil is normally acidic on the pH scale.**
- 13. The highest percentage of soil is insoluble.**
- 14. Bacteria from decomposing body oils, perspiration and foods can cause permanent discolorations.**
- 15. The best way to remove dry soil is by vacuuming.**

Review 5
Principles & Methods

- 1. The principle of dry soil removal is frequently skipped.*
- 2. The second principle is soil suspension.*
- 3. The cleaning pie consists of Time, Agitation, Chemical, Temperature.*
- 4. Soil extraction may include absorption, extraction & vacuuming.*
- 5. Natural fiber velvets should be groomed immediately following cleaning.*
- 6. Air movers should be placed parallel to the fabric rather than perpendicular.*
- 7. According to the S300 fabric cleaning should be performed every 12 -24 months*
- 8. Dry solvent cleaning will only achieve moderate results on heavily soiled fabric or on water based soiling.*
- 9. Flash point refers to the temperature at which a vapor will ignite.*
- 10. For maximum soil removal and flushing use hot water extraction.*
- 11. Choose appropriate Personal Protective Equipment at the job site.*
- 12. An acidic dry foam is a good replacement for dry solvents.*
- 13. Fabric cleaning is best done using lower pressure.*
- 14. All chemicals must have a MSDS in the truck.*
- 15. To be safe use an acid rinse and leave the fabric dry.*

*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 softening 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 which 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 acidic 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. Adding a nonionic surfactant to a cationic surfactant will not change the charge.*
- 15. Adding a scented deodorizer leaves a pleasant fragrance 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. An alkaline detergent is used on soiled synthetic fabrics.*
- 3. An acid rinse is the best choice for neutralizing a preconditioner.*
- 4. For all fabrics the safest pH to use is between 5-7.*
- 5. A fluorochemical repels all three types of soils.*
- 6. A gallon contains 128 ounces.*
- 7. A spot adds substance to the fabric, a stain adds dye.*
- 8. Asking the customer, noting the location, and using your senses help to identify the spot.*
- 9. An 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 be sure to neutralize and rinse.*
- 13. Acne medicines contain benzoyl peroxide which 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
Preinspection & Problems

- 1. A thorough preinspection and communication with the customer will prevent many problems.*
- 2. When inspecting the inside of a cushion look for ink marks and for deterioration of the foam.*
- 3. Colorfastness tests are not conclusive until the fabric is dry.*
- 4. An S code on fabric usually recommends dry solvent cleaning.*
- 5. The tag found on the deck of the sofa listing fibers refers to the material inside the sofa, not fabric on the sofa.*
- 6. First step for cleaning is to place a furniture pad under the piece to be cleaned.*
- 7. Due to water rings developing it is best to mist the decking material prior to cleaning the piece.*
- 8. When arranging the cushions for optimal drying it is best to place them on an absorbent material. Do not place on the deck.*
- 9. Jacquard fabrics are prone to bleeding.*
- 10. Look for a loss of sheen on a polished cotton fabric.*
- 11. Office partitions are easy to clean due to the synthetic fabric.*
- 12. Browning is caused by alkalinity, slow drying, and cellulose.*
- 13. Shrinkage is caused by the absorption of yarns.*
- 14. Velvet weaves can easily distort and must be carded immediately.*
- 15. A presentation without a demonstration is just a conversation.*



IICRC CERTIFICATIONS

IICRC Revised Rules and Regulations for IICRC Certifications Available by Examination

● Academic: All course examinations must be passed with **75% or higher** to achieve certification. All prerequisites **must be current**.

Textile Division – Cleaning & Maintenance Certifications

Carpet Cleaning Technician (2 days) (CCT) Exam 101

Commercial Carpet Maintenance Technician (2 days) (CCMT) Exam 201

Upholstery and Fabric Cleaning Technician (2 days) (UFT) Exam 301

Rug Cleaning Technician (3 days) (RCT) Exam 141

• Prerequisites: IICRC Certification in CCT or UFT

Color Repair Technician (2 days) (CRT) Exam 701

• Prerequisites: IICRC Certification in CCT or CCMT

Leather Cleaning Technician (2 days) (LCT) Exam 311

House Cleaning Technician (2 days) (HCT) Exam 321

Textile Division – General Inspection, Repairs and Installation Certifications

Senior Carpet Inspector (6 days) (SCI) Exam 801

• Prerequisites: Current Certification in CMT or CCT, and RRT. In the first year after passing the SCI exam, students must submit 3 reports for review by the instructor, and at least 3 more for independent review. Inspector status will not be awarded until reports are approved by reviewers.

Carpet Repair and Reinstallation Technician (2 days) (RRT) Exam 601

Hard Surface Division – Cleaning & Maintenance Certifications

Floor Care Technician (2 days) (FCT) Exam 231

Resilient Floor Maintenance Technician (2 days) (RFMT) Exam 251

Stone, Masonry, and Ceramic Tile Cleaning Technician (2 days) (SMT) Exam 241

Wood Floor Maintenance Technician (2 days) (WFMT) Exam 261

Hard Surface Division – Inspection Certifications

Introduction to Substrate and Subfloor Inspection (3 days) (ISSI) Exam 811

Resilient Flooring Inspector (4 days) (RFI) Exam 831

• Prerequisite: Certification in SSI or ISSI. In the first year after passing the RFI exam, students must submit 3 reports for review by the instructor, and *at least* 3 more for review by an independent reviewer. Inspector status will not be awarded until reports are approved by reviewers.

Stone, Ceramic Flooring Inspector (4 days) (SCFI) Pending

(merged from previous MSI and CTI courses)

• Prerequisite: Certification in SSI or ISSI. In the first year after passing the SCFI exam, students must submit 3 reports for review by the instructor, and at least 3 more for independent review. Inspector status will not be awarded until reports are approved by reviewers.

Wood Laminate Flooring Inspector (4 days) (WLFI) Exam 851

• Prerequisites: Certification in SSI or ISSI. In the first year after passing the WLFI exam, students must submit 3 reports for review by the instructor, and at least 3 more for independent review. Inspector status will not be awarded until reports are approved by reviewers.

Restoration Division – Water-related Certifications

Water Damage Restoration Technician (3 days) (WRT) Exam 501

Applied Structural Drying Technician (3 days) (ASD) Exam 511

• Prerequisite: IICRC Certification in WRT

Water Restoration/Applied Structural Drying Combo (5 days) (WRT/ASD) Exams 501 & 511

• This combination course must be attended in its entirety, along with both WRT and ASD exams, during that same five (5) day period. If any portion of the course and exam are not completed during the 5-day period, students must re-attend the entire 5-day course to receive both certifications. No portion of the 5-day course can be applied to either a WRT or ASD course being taught separately.

Commercial Drying Specialist (4.5 days) (CDS) Exam 541

• Prerequisites: IICRC Certification in WRT. **Note to Participants:** Commercial drying projects frequently have many more potential hazards and safety risks than those normally encountered on residential projects. These hazards can include, but are not be limited to: higher voltages, confined spaces, energized machinery, hazardous chemicals, heavy equipment and forklifts. CDS is not intended to be a health and safety course, nor does it cover all potential hazards that may be encountered on commercial projects. Participants must comply with applicable federal, state/provincial, and local safety rules and regulations. Participants are strongly advised to research and complete appropriate training programs (e.g. HST, OSHA 10-hour, Canadian HST, AU/NZ HST) before participating in the CDS course.

Applied Microbial Remediation Technician (4 days) (AMRT) Exam 521

Prerequisite: IICRC Certification in WRT

Applied Microbial Remediation Specialist (NOTE: This is an advanced designation and NOT a course or certification) (AMRS)

Prerequisites: AMRT: **and** HST or an OSHA 10-hour General Industry Health and Safety course, or other suitable training, subject to prior IICRC approval (*there are no HST equivalents in Canada, Australia or New Zealand*); **and** one year verifiable microbial remediation experience *after* obtaining 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 appropriate Project Sheets.

Building Moisture Thermography (2 days) (BMT) Exam 581

Restoration Division – General Restoration-related Certifications

Fire & Smoke Restoration Damage Technician (2 days) (FSRT) Exam 901

Odor Control Technician (1 day) (OCT) Exam 401

Contents Processing Restoration Technician TBD (CPT) TBD

Trauma and Crime Scene Technician TBD (TCST) TBD

Health and Safety Technician – US (2 days) (HST) Exam 451

(or equivalent OSHA 10-hour General Industry Health and Safety course, or other suitable program subject to **prior IICRC approval**)

Health and Safety Technician – Canada (2 days) (HST) Exam 452

Health and Safety Technician – Australia/New Zealand (2 days) (HST) Exam 453

(there are no HST equivalents in Canada, Australia or New Zealand)

Advanced Designations (No Examination)

Advanced Designations are automatically awarded after attaining the proper credits

Journeyman Textile Cleaner (JTC) – 3 Certification: CCT (or CCMT) and UFT, and either OCT, CRT, or RRT; A minimum of twelve (12) months after original IICRC certification date plus attainment of certifications as listed.

Master Textile Cleaner (MTC) – 5 Certifications: CCT (or CCMT), UFT, OCT, RRT (or BRT), and CRT

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

Journeyman Water Restorer (JWR) – 3 Certifications: CCT (or CMT), WRT and RRT

A minimum of twelve (12) months after original IICRC certification date plus attainment of certifications as listed.

Master Water Restorer (MWR) – 6 Certifications: in CCT (or CCMT), RRT, WRT, ASD, AMRT, and HST (or US equivalent)

(There are no HST equivalents in Canada, Australia or New Zealand)

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

Journeyman Fire & Smoke Restorer (JSR) – 3 Certifications: UFT, OCT, and FSRT

A minimum of twelve (12) months after original IICRC certification date plus attainment of certifications as listed.

Master Fire & Smoke Restorer (MSR) – 5 Certifications: CCT (or CCMT), UFT, OCT, FSRT, and HST

(or US equivalent) *(There are no HST equivalents in Canada, Australia or New Zealand)*

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

ICRC Testing Fee Structure – U.S. and Canada (US Dollars)

All Technician Exams (excluding AMRT & Inspector): \$ 65.00

AMRT and Inspector: \$150.00

Retest: \$ 65.00 (effective 11/1/17; all exams)

Only two retests are allowed. Exams must be retaken within 90 days of receiving test results; otherwise, course re-attendance and passing the appropriate exam is required.

Annual Registration Fee – U.S. and Canada (US Dollars)

After one (1) year, registrant will receive annual renewal billing. Cost for annual certification renewal is:

- Certified in 1 or 2 categories = \$36 annually;
- Certified in 3 and 4 categories = \$48 annually, and
- Certification in 5 or more categories = \$60 annually.
- Master status is an additional = \$12 annually.
- AMRT certification = \$72.00 annually.

Certified Inspector: Once inspectors pass their probationary requirements, they may choose to be listed as “Practicing” or “Credentialed” Inspectors. **Practicing inspectors pay \$96.00 annually** for fees with listing on the IICRC consumer referral phone number and the web site, while **Credentialed inspectors pay \$48.00 annually** with no listing.

Hard Surface inspectors are listed only as Practicing, and are required to **pay \$96.00 annually** to maintain their status.

Annual Registration Fee – Europe

After one (1) year, registrant will receive annual renewal billing. Cost for annual certification renewal is:

- Certified in 1 or more than 5 categories = £48 annually;
- Master status = additional £10 annually, and
- AMRT and Inspector fees = £100 annually.
- Credentialed Inspector = additional £50 annually

All fees include applicable standard VAT rate (01.2009).

Annual Registration Fee – Asia Pacific (Australian Dollars)

After one (1) year, registrant will receive annual renewal billing. Cost for annual certification renewal is:

- Certified in 1 or 2 categories = \$60 annually;
- Certified in 3 and 4 categories = \$70 annually, and
- Certification in 5 or more categories = \$80 annually.
- Master status is an additional = \$30 annually.
- AMRT certification = \$90.00 annually
- Practicing Inspector = \$150.00 annually
- Credentialed Inspector = \$70.00 annually.

Maintaining Certification: Registrants must maintain all prerequisite and required courses to attain and maintain certifications requiring prerequisites and advanced designation status. (For example, WRT must be maintained to first attain and then to maintain ASD, and all supporting designations must be maintained to attain and to maintain Journeyman, Master, and Inspector status according to current IICRC policies).

NOTE: If registrants allow certification to lapse for twelve (12) months or longer, they are required to re-attend an approved course, retake the exam and pay appropriate fees. If registrants wish to reinstate certification within the twelve (12) month grace period, paying outstanding fees and fulfilling continuing education credits are required. Registrants must follow the Code of Ethics or be subject to sanctions up to and including loss of certification.

Continuing Education Credit (CEC) Program

A. Purpose: To encourage IICRC registrants to participate in their industry through conventions, workshops and other educational events with continuing education programs, and by sharing knowledge with others in the industry.

B. Fields of Study: Due to different levels of certification, the CEC program is divided into 2 parts: **1. Inspectors or Master Cleaners/Restorers** must attain 2 CECs every 2 years.

2. Cleaning/Restoration Registrants must attain 2 CECs every 4 years.

C. Categories in which CECs may be earned: **1. Schools:** One CEC will be earned for every 7 hours of classroom instruction. ½ credit may be earned for pre-approved half-day (3.5 hour) workshops or technical meetings. All events must be pre-approved by the IICRC Education Department. Schools qualifying for CECs fall into 1 of

2 categories: **a. Inspection-related:** (2-year requirement) attending or re-attending one or more of the following:

(1) SCI, CCT, CCMT, RRT, ISSI, WFI, SCFI, WFI - 2 CECs

(2) Inspectors Update (minimum 2 days) or qualifying on-line courses - 2 CECs

b. Cleaning/Restoration Technicians (4-year requirement) attending or re-attending 1 or more of the following courses: (1) SCI, CCT, CCMT, UFT, WRT, CRT, RRT, FSRT, FCT, HST - 2 CECs

(2) OCT - 1 CEC

(3) Related Technical courses - maximum of 2 CECs

(4) Approved management courses - maximum of 2 CECs

2. National or Regional Conventions and Markets:

a. Conventions - Shareholder association conventions qualify for a maximum of 2 CECs, or 1 per day depending on the appropriateness of the subjects taught.

b. Carpet Markets (e.g., “Surfaces”) - Full registration with workshop attendance is required to qualify for a maximum of 2 CEC, or 1 per day of attendance, depending on the appropriateness of the subjects taught.

D. Other IICRC-approved Programs - Additional programs or workshops already have been qualified and are on file at IICRC Headquarters. New programs and workshops held by suppliers, associations and schools are being reviewed on a regular basis.

E. Distance Learning – These are self-paced web-based training programs. Registrants can access these programs via the Internet at www.iicrc.org.

F. Notification: Written notice of the need for CECs will be mailed to registrants one year in advance of certification expiration by IICRC Headquarters. ***Registrants are responsible for notifying IICRC of any change of employment or address.***

G. Verification of CECs: ***The form “Application for IICRC CECs” should be copied and taken to any event a Registrant attends for CECs. Do not assume that forms will be available at an event. Maintaining documentation for earned CECs is the Registrant’s responsibility. Registrants should complete their information, have an event sponsor sign the application, and Registrant should submit the form to IICRC when notified that CECs are required, along with renewal payments.*** Verification forms should be accompanied by lists of convention attendees and their companies for further confirmation. If individuals wish to verify convention attendance themselves, they should forward to the IICRC copies of the official registration documents specifying their name and company. Then, IICRC Administrative Staff can compare the request for CECs with the list provided by the association sponsoring the convention.

Verification of CECs through approved schools can be accomplished within the existing framework of IICRC school administration, with which approved instructors are familiar. The CEC application can be filled out by the individual, the instructor must sign and return to student to be submitted to IICRC upon request along with renewal payment.

Certified Firms

Certified Firms value technical proficiency and training; are active in the industry; provide services with honesty and integrity; maintain high corporate ethics, and exercise environmental responsibility. They commit to: abide by the IICRC Code of Ethics document, licensing and insurance, maintain customer complaint policy, and provide on-going education for all technicians.

Certified Firm benefits include: use of IICRC logo, listing and firm information on consumer referral website at www.iicrc.org, listing on referral network phone number; industry-wide promotion and recognition, and subscription to IICRC Journal.

To become an IICRC Certified Firm (CF), a CF must have at least one currently certified technician on staff for each advertised service and must submit a CF Application Request Form to IICRC with a one-time nonrefundable \$25.00 processing fee. Upon approval of the request form, the firm is sent an Application for Certified Firm. The Application must be forwarded to headquarters with proof of licensing and insurance, and payment of the annual \$199.00 CF fee. The annual fee is separate from the \$25.00 processing fee and is also nonrefundable. Once Certified Firm status is granted, the firm is immediately listed on the Toll-free IICRC Referral System as well as IICRC web site at www.iicrc.org. The Certified Firm also is eligible at this time to use the registered trademark for advertising purposes.

IICRC Reserves the Unqualified Right to Change and Revise the Policies, Procedures and Requirements.

You may review the Privacy Policy at www.iicrc.org/privacy-policy.

Revised August 2017



PROCESS FOR BECOMING AN IICRC CERTIFIED FIRM

Firms must first fill out a “Certified Firm Application Request Form” and submit it to IICRC headquarters with a nonrefundable \$25 application fee. A copy of the “Certified Firm Application Request Form” is included with these instructions. Once the request form is received and reviewed by IICRC headquarters to make sure the certification technician requirements have been met, the company will be sent a “Certified Firm Application” and “Code of Ethics.” Next the firm signs and returns a completed application and code of ethics, along with a copy of its business license (if applicable), proof of general liability and workers compensation insurance, and a nonrefundable payment of \$199 for the first year’s registration fees. Firms agree to have an IICRC-certified technician present on all job sites. The assigned technician(s) must be certified in all categories of services being performed on the job site for which IICRC offers certification, and must perform or supervise the job site work. A good faith exception to this requirement will apply for new Certified Firms for a period of one year after obtaining Certified Firm status, provided that a documented continuing education program is actively pursued. 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 application. For example, if the firm became registered on June 1 of the year in which it paid the \$199.00 annual registration, the annual renewal bill in November would be \$100.00. 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 inactivated and benefits suspended. The firm may be reinstated when requirements are met and fees are paid. Certified Firms are not eligible to order supplies such as decals and patches or receive Certified Firm credentials until they meet all requirements. Only Certified Firms may display the IICRC registered service mark.

Revised 6/27/17 DA



IICRC
Institute of Inspection Cleaning
and Restoration Certification

CERTIFIED FIRM APPLICATION REQUEST FORM

Date _____

Name _____

Title _____

Firm Name _____

Firm Address _____

City _____ State/Prov _____ Zip/Postal Code _____

Country _____ Mobile/Pager _____

Phone _____ Fax _____

E-Mail _____ Website _____

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

The 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 Certified Firm
4043 South Eastern Ave.
Las Vegas, NV 89119
Email: certifiedfirms@iicrcnet.org

The first year's fee for Certified Firm Status is \$199 (U.S. funds) and must accompany your final application. The second year's fee will be prorated based on the acceptance date of the original application. The annual renewal fee will be \$199 every year thereafter. 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.

Revised 6/27/17 DA