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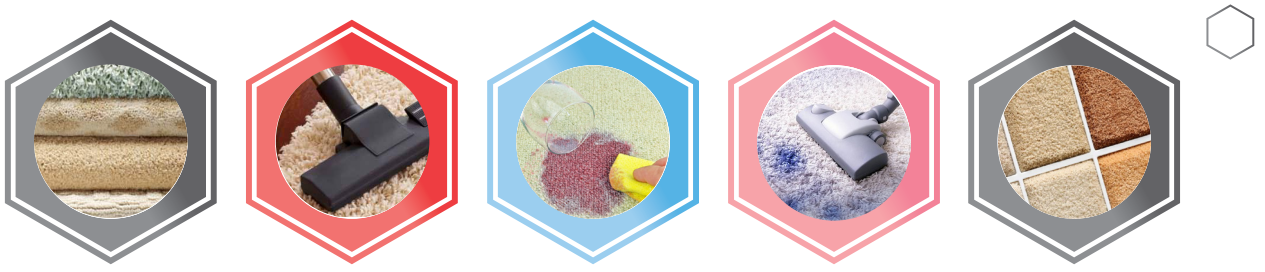
Carpet Care



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INTRODUCTION

Successful building maintenance involves effective floor cleaning and upkeep. Many facilities have a combination of hard floors, such as vinyl tiles or quarry tiles and carpeted floors. This requires the cleaning staff to be trained in cleaning both hard floors and carpeting. It is estimated that up to 50% of all non-industrial floors are now carpeted, so the potential market for carpet cleaning is huge. Knowledge of the essentials of carpet care will make a big difference in the appearance of the carpeting. This brochure discusses the many aspects of carpet care.

HISTORY

Carpet making goes back to at least 6000 BC. By 3000 BC, the Egyptians were making woven carpets that resemble today's handmade carpeting. In 500 BC the Chinese were making woven carpets on primitive horizontal frames. Early looms were made from two forked tree branches joined by a crosspiece. Gradually carpet making spread to Europe. By the 1600s, there were large groups of weavers in France. Better machines continued to refine the process until 1787 when the steam powered loom made weaving an entirely automated process. By 1839, most carpeting was being made by steam powered loom.

Carpet cleaning was first done by sweeping the carpet with a broom. In 1869, the nonelectric forerunner of a vacuum cleaner, minus the rotating brush, was developed. The brush was added in 1875 to a similar nonelectric machine. 1901 brought the first gas powered suction machine, and in 1905 the first portable (92 lbs.) electric suction cleaner was invented. The Hoovers bought the rights to this machine in 1908 and started making their version of the modern vacuum cleaner.

CARPET TYPES

Carpeting comes in two basic types, woven and tufted. Woven carpeting is manufactured on carpet looms where all of the yarns, such as pile, stuffer and backing yarns are fed into the loom at one time. Tufted carpeting, which is much more common, loops yarns through a layer of a backing fabric. A loop or tuft is formed by trapping the yarn underneath the backing. To anchor the tufts permanently in place, this primary backing is coated with latex or another adhesive which either becomes a secondary backing or has a secondary backing applied to it. Tufted carpet is produced 15 times faster than woven carpet and is available in either loop or cut pile. Loop pile has the surface yarns woven into the body of the fabric without being cut. Cut pile has a surface made up of the cut ends of the pile yarn. Tufted carpeting has a secondary backing, such as rubber, vinyl or polypropylene. Because tufted carpet can be manufactured much more quickly than woven carpet, tufted carpet is much more common and less expensive. Natural carpeting is made from cotton or wool. Synthetic carpeting is made from polyester, acrylics, olefins (polypropylene) or nylon. The synthetic yarn carpets are much more resistant to overwetting than a natural fiber, such as wool or cotton. All carpet fibers are dyed with acids at high temperatures. This makes all carpet fibers acidic. The most common carpet types are the following:

1. Wool can be stretched to 140% of its length before breaking. One pound of wool can absorb 0.3 lb. of water, which is as much as ten times what synthetics can absorb. Wool is naturally flame retardant and resists static electricity. It is excellent at soil hiding and stain removal, but tends to hold odors. To test if a carpet is wool, cut a fiber from the carpet (where it won't be noticed) and burn it for a few seconds. If the fiber extinguishes itself quickly and the burnt fiber crumbles into ash when squeezed, it is wool. All synthetics give a hard bead when burned. Overwetting wool causes it to shrink as it dries, so it is a poor choice in a wet environment. Chemicals applied to wool carpeting need to have a pH between 5.5 - 7.0 at use dilution. Bleaches (both chlorine and oxygen), strong alkali and strong acids will all damage wool. Wool needs a lot of maintenance to keep up the high level of appearance. Casinos use a lot of wool carpeting despite its high maintenance requirements and sensitivity to moisture because of the excellent appearance.

2. Nylon offers good abrasion resistance, is inexpensive and can easily be dyed different colors during manufacture. There are currently 5 different generations of nylon carpeting. Nylon has a low melt point and burns easily. High friction can melt nylon and it has a strong attraction for oily soils. Nylon carpets typically are treated with a stain repellant, which can be removed through the use of dry cleaning solvents, so avoid their use on nylon carpets. Strong acids and alkalis all damage nylon, so pH neutral cleaners should be used, although cleaners with a pH of 7 to 10 are usually safe. On all types of carpeting, the pH of the cleaners should not exceed 12.

3. Olefin (Polypropylene) carpeting is the least water absorbent. Like nylon, it has a strong affinity for oily soils, so staining is a problem. Because it doesn't absorb water readily, it is used extensively for outdoor carpeting.

4. Polyester is an inexpensive carpet mostly used in residential applications.

Regardless of the material used in the manufacture of the carpeting, there are several different technical specifications used to determine the quality of a carpet. The next section discusses four common measurements of quality.

QUALITY FACTORS IN CARPETING

Gauge measures the closeness of the construction (in tufts per inch) along the width of the carpet. Six gauge carpet is home quality, while 8 gauge can be either commercial or residential. Ten gauge is the most common commercial carpeting, while 12 gauge carpeting is occasionally manufactured for high traffic areas.

Stitch measures the number of times the needle punctures each inch of the backing with the pile yarn. Stitch is measured perpendicular to the gauge. Eight stitch is generally the maximum in tufted construction. Multiplying the gauge by the stitch yields the number of tufts per square inch of carpeting. For commercial carpeting, 56 tufts per square inch is frequently recommended as the maximum. The lower the number, the lower the quality of the carpeting.

Pile Weight is the amount of pile yarn in one yard of carpeting. Below 20 ounce is low quality. 20 to 36 ounce is medium quality. 36 to 60 ounce is high quality. A closer construction carpet (more tufts per square inch) is always preferable to a looser construction (fewer tufts per square inch) even if they both have the same pile weight. Pile Height is literally a measure of the lengths of the tufts. “1000” carpeting has one inch tufts. Half inch tufts are “500” and quarter inch tufts are “250”. The lower the pile height, the more it resists crushing and shading. Higher pile carpeting looks more luxurious, but breaks down much more quickly.

Uncut or loop pile is more expensive, but usually a better choice for any high traffic area than cut pile because it resists crushing and shading better. Simply by using your finger and scratching the carpet, a rough determination of quality can be made. With low quality carpet, scratching will allow the finger to penetrate to the first backing. Medium quality carpeting resists this and it is impossible to reach the backing in high quality carpeting.

COMMON PROBLEMS WITH CARPETING

Regardless of the material used to make the carpet, carpet maintenance programs frequently encounter the following problems. All carpets eventually wear out. It is the job of the carpet care program to prolong the life of the carpet and keep up the appearance.

1. **Pile Reversal** often occurs, especially in pivot points. This is seen as a color change in patches on the carpet. As the viewer’s perspective changes so does the color difference. This is not necessarily a permanent damage, but once the pile is damaged, it cannot be corrected. More frequent cleaning helps to prevent this from occurring.
2. **Abrasion** will result in bare patches or in matted down areas. This will often appear to improve when the carpet is wet, but is caused by permanent damage to the pile in the carpeting.
3. **Color Change** can be caused by chemical damage, pesticide application, sunlight or stains. If the stain is removable, it might be possible to remove the color change, but in most cases, the color change is the result of permanent damage to the carpet fibers. Fading happens to all carpets over time. To minimize fading, vacuum frequently, minimize humidity and eliminate exposure to sunlight.
4. **Shadows** are another form of color change. If the amount of light in an area varies, the carpeting will often appear to be different colors. Under windows, carpeting will often appear darker because the sunlight makes the rest of the carpeting appear lighter.
5. **Shedding** is common for new carpet. The first several vacuumings will remove a large amount of loose fiber.
6. **Sprouting** is a single tuft of fabric fiber extending beyond the carpet surface. It usually occurs along the walls or seams. These can be cut off. Don’t ever pull on a tuft as it can cause the carpeting to unravel.
7. **Bulking and Wrinkling** can occur in large area installations. The carpeting will often need to be restretched to remove the wrinkles. Contact with water can cause this as well, so water contact should be minimized.
8. **Browning** can occur if any alkaline residue is left in the carpet. Neutralizing the alkalinity with a mild acid will often remove the browning.
9. **Burns** are irreversible damage to the carpet. Cutting off the burn portion of the darkened burnt fibers may help but cutting too much of the fiber leaves bare patches.
10. **Watermarking** is a special form of shading where large areas of the carpet appear to be a different shade. The shaded areas are random and are not caused by light sources. The areas have the appearance of large puddles of water and are

caused by pile reversal. Exhaustive studies have shown that the cause of this condition is unknown and not related to manufacturing defects or cleaning procedures. This is a nonreversible condition.

SPOTS AND STAINS

One of the toughest problems in carpet care is dealing with spots and stains. Spots and stains can be divided into four main groups as follows:

A. **Water soluble** - sugar, many foods
B. **Solvent soluble** - oils, greases, waxes
C. **Insoluble** - pigments, toner, carbon
D. **Special** - protein, rust, iodine

Stains should also be viewed in the context of adding or removing color from the carpet. Stains that cause color gain can be irreversible, such as mustard or herbal tea, or they can be reversible, like ink. Stains that cause color loss, such as bleaching, are irreversible, but others are reversible, such as indicator dyes. To be effective in removing spots and stains, it is necessary to identify the spot or stain. Some stain treatment procedures will make a spot or stain worse if applied to the wrong things. The easiest way to identify the spot or stain is to ask. Many times the staff at a facility knows what made the spot or stain. The location, appearance, texture and smell may all provide clues as well.

Large spills on floors can wick back through the carpet at later times. If the spill soaks into the concrete floor under the carpet, the liquid will slowly climb the carpet fiber and evaporate leaving a spot or stain. The hotter the temperature in the environment, the faster the reappearance of the spot or stain. As the spot or stain reappears, retreat it and eventually it will disappear.

Certain chemicals, such as quaternary ammonium carpet sanitizers, can build up in the fibers and burn the carpet fibers when applied to the carpet. This damage is irreversible. Static protectants that are applied to carpeting can be removed by extraction to avoid buildups. These buildups can also cause damage to the fibers.

Toner from copying machines is one of the worst problems to handle. For removing toner from carpeting, follow this procedure.

1. Start dry
2. Vacuum above the surface and work down to the surface
3. Added a powdered spotter
4. Wet treat with solvent spotters

RULES FOR SPOT AND STAIN REMOVAL

1. Not all spots and stains will come out.
2. The older a spot or stain, the tougher it will be to remove.
3. The more the spot or stain has been treated, the tougher it will be to remove.
4. One type of spotter will not remove all spots or stains.
5. Follow the three P's of spotting
   A. **Products** - Use the right products the first time.
   B. **Procedures** - Don't shortcut the procedures, it just makes things worse.
   C. **Patience** - Rushing or hurrying will not help. Some spots and stains are just tough to take out and require repeat applications.

SPOT OR STAIN REMOVAL TECHNIQUES

1. Treat an area two to three times as large as the stain with the appropriate chemical.
2. Agitate with a carpet scraping tool, working towards the center of the spot or stain. If using a brush to agitate, place a cloth over the stain and tap the spot firmly, but do not scrub. Scrubbing tends to damage the carpeting and work the soil into the carpet fibers.
3. Allow the chemical to work for up to 15 minutes.
4. Agitate the spot or stain again, always working towards the center.
5. If a hand extractor is available, use it to remove the chemical.
6. Otherwise, blot to the center with an absorbent disposable cloth until the cloth comes up clean. Don't press too hard (never press down with your foot on a spot or stain).

7. Rinse with water. Have a spray bottle with a label that reads “Rinse Water”.
8. Repeat the blotting until the cloth comes up clean.
9. Repeat rinsing to insure that all of the chemical has been removed from the carpeting.

VACUUMING A CARPET

All carpet maintenance programs should include the following steps:
1. Move furniture from the area to be cleaned.
2. Pick up any large debris.
3. Vacuum the area.
4. Remove any spots or stains.
5. Bonnet buffing or hot water extraction (if desired).

Soils in carpeting are usually 85 - 95% dry soils and 5 - 15% wet (usually oily) soils. One of the keys to carpet maintenance is to clean it regularly by vacuuming, before it becomes noticeably dirty. If the carpet is only cleaned when visibly dirty, the carpet doesn’t recover as well inappearance. Small pieces of stone, sand, or other soils get trapped in the carpeting and because of their rough edges, act like little saws on the carpet fibers. The longer this occurs, the worse it is for the carpeting and the more the pile is permanently damaged, thus frequent vacuuming is critical.

Carpet rakes are hand tools designed to both work the chemicals into the fibers during cleaning and to decrease drying time by up to 30% by agitating the fibers. Surface soils removed by vacuuming are just the tip of the iceberg. The deeper you go in cleaning a carpet, the tougher it is to clean. Vacuuming needs to be done frequently, but is the lowest level of maintenance. A maintenance program can be thought of as having levels of carpet maintenance. Vacuuming is lowest level, followed by bonnet buffing, with hot water extraction being the highest level of maintenance. Hot water extraction is the best cleaning procedure, but takes the most time and leaves the carpet wet, requiring drying time before it can be walked on again.

Because of the problems that water can cause in carpeting, especially wool carpeting, many companies offer a dry powder that can be sprinkled onto carpeting to aid vacuuming. This powder has a large particle size and will stick to the dry soils making it easier to vacuum up the dry soils from the carpeting. This procedure allows for a maintenance cycle of less frequent bonnet buffing or extracting. When this product is applied to the carpet, brushing the carpet with a carpet rake works the powder into the pile, making it clean better. Allowing the product to work for 10 minutes before vacuuming also helps to pull up the soils. When applied to a reoccurring stain, it helps to pull the stain out as well. The best products of this type have a recovery rate of 99.6% on vacuuming. Vacuuming technique should always emphasize pulling, rather than pushing with the vacuum as this is much more efficient. Pushing moves a vacuum cleaner in the same direction as the brush head is turning, reducing the mechanical action to the carpet. Pulling moves the vacuum cleaner in the opposite direction as the brush head is turning, increasing the mechanical action to the carpet. The higher the mechanical action to the carpeting, the more soil that is removed.

Walk off mats help prolong the life of the carpeting by removing soils from shoes that would otherwise be ground into the carpet. 8 - 12 ft of matting should be placed near all entrances. This helps pull the heaviest soils off of the shoes before the people reach the carpeting. Approximately 70% of carpet soils are tracked in from outdoors via foot traffic. 30% of the dirt is trapped within the first 3 feet, with 85% of the dirt being trapped within 12 feet. Vinyl backed walk-off mats are always preferable to rubber backed mats when placed over carpeting. The rubber backed mats can blacken the carpeting and should be used over tile and stone floors. The rubber backing will help the mat grip the floor and not slide as people walk on them. To check a mat, wipe the backing with a clean wet cotton cloth. If the cloth picks up black from the mat, it is rubber backed. The mats need to be kept clean to avoid tracking the soils onto the carpeting. When shaking out walk off mats, don’t do this onto the carpeting. They should always be shaken out on a hard floor or outdoors. Vacuuming walk off mats should be done daily and extraction should occur frequently as well. Dirty walk off mats trap very little soil. One tip to help keep walk off mats clean is to sweep the area outside of the building in front of the entrances every day. This helps remove dirt and debris before it can be tracked onto the walk off mats or onto the carpeting in the building.

BONNET BUFFING A CARPET

Bonnet buffing of a carpet is an intermediate level of treatment. When carpet extraction is not an option, because of labor or carpet drying time, bonnet buffing will do more cleaning than vacuuming without wetting the carpet as much as extraction does.

Vacuuming doesn't remove all of the soil, just the soils that are loose. Bonnet buffing cleans the top 1/3 of the fiber and lifts up some of the dirt below it. The procedure is as follows:

1. Remove equipment or furniture from the area to be cleaned.
2. Apply the cleaning chemical to be used to a 10 ft by 15 ft portion of the carpet with a trigger spray bottle or pump up sprayer. Do not treat too large of an area at one time. If the chemicals are allowed to dry into the carpet, they can damage the carpet.
3. Soak the yarn bonnet in water and wring out (wet method) or use a dry bonnet (dry method).
4. Allow the chemical 8 - 10 minutes to work. Agitate the carpet with a carpet rake during this time. Do not let the carpeting dry out if wet cleaning. Reapply the cleaning chemical if necessary.
5. Bonnet buff the floor using a 175 rpm floor buffing machine with any pad under the bonnet. Rinse out the bonnet at frequent intervals with tap water to remove any buildups of soil if using the wet method. Turn over the bonnet frequently and shake it out (if using the dry bonnet method) to avoid building up soils in the bonnet. If too much soil builds up in the bonnet, the soils may end up being redeposited onto the carpet from the bonnet instead of being removed.

Some companies promote a somewhat different technique also called dry bonnet buffing. A powdered, rather than liquid cleaner, is sprinkled on the floor and then buffed with a dry bonnet to spread it out. Vacuuming removes the powder and the dirt, which is now stuck to it. This is really just a different version of the previously mentioned method of sprinkling a power on the floor and vacuuming it up. The difference is that buffing moves the powder around more than using a carpet rake. This method is less efficient than wet bonnet buffing, but the carpet can be walked on immediately after cleaning. With wet bonnet buffing, the drying time varies depending on the amount of water applied with the bonnet, but it is typically one hour or less. Any time the carpet is wet, it should be allowed to dry before traffic is allowed back on the carpet. Carpets damage easily if they are walked on while wet. To speed drying by increasing air circulation, use carpet fans, turn on the heating or air conditioning system or open windows. Launder wet method bonnets after each use and dry method bonnets whenever they become visibly soiled.

WATER EXTRACTION CARPET CLEANING

Water extraction carpet cleaners are very similar to floor automatic scrubbing machines and carpet shampooers. A carpet shampooing machine looks like a 175 rpm swing buffer but may have a hand held wand that sprays the detergent and uses a brush instead of a pad. The shampooer scrubs the cleaning solution into the carpet at the same time it is applied. Most shampooers also vacuum up a portion of the cleaning solution at the same time into a recovery tank. A shampooer tends to entrap the soils in the detergent left on the floor. After the detergent dries, the soil and detergent are vacuumed up.

A carpet extractor has a rinse water tank, a recovery tank and a rotary brush. The extractor operates by walking backwards so that you don't have to walk on the wet carpet. The rotary brush agitates the carpet while the spray jets apply a detergent or a rinse water solution at 40 - 100 psi. There are two main methods of cleaning with a hot water extractor. In the first method, the detergent solution is put into an extractor and the solution is applied to the carpet then vacuumed up immediately. The big disadvantage with this method is that it only allows a 3 - 5 second contact time for the chemicals and tends to leave a detergent residue in the carpet making it attract soils. The second method is to spray the carpet with the detergent solution and use rinse water in the extractor. This is the preferred method for cleaning as it allows for a longer contact time and rinses the carpet to remove detergent residues. To clean a carpet with an extractor, follow this procedure.

1. Spray a 10 ft by 15 ft portion of the carpet with the cleaning solution in a trigger spray bottle or pump up sprayer. Agitate the carpet with a carpet rake.
2. Fill the extractor with rinse water in the detergent tank and a small amount of defoamer in the recovery tank.
3. Allow 8 - 10 minutes of contact time for the chemicals to work before extracting, but don't allow the carpet to dry out.
4. Extract the carpet, walking backwards to avoid walking on the cleaned wet carpet.
5. Repeat the treatment process if necessary.
6. Some wool carpet manufacturers recommend a mild acidic rinse to neutralize alkaline residues that might remain after extraction cleaning.

SUMMARY

This brochure summarized the basics of carpet care including an introduction to the various types of carpeting and the different maintenance methods available. Spot and stain removal were discussed in depth as were common carpeting problems. Successful carpet care programs use a variety of cleaning techniques, but regular vacuuming to control buildups of dirt before permanent damage to the carpeting occurs is always the key.

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