When should carpet be cleaned?

Creating a comprehensive maintenance plan for your facility to extend carpet life

A WHITE PAPER BROUGHT TO YOU BY

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Executive Summary

This paper examines the components of proper carpet maintenance for enhanced appearance and maximized life of the investment. With much research in color space and soiling levels, new technology has emerged to measure and track the appearance of carpeting, which is utilized in planning the preferred frequencies and methods of cleaning.

Carpet is a major investment and integral to a facility's appearance. Because of this, dirt and stains can have significant negative impacts, whether facilitating a bad image of the building or health and safety concerns. With 14.4 billion square feet of carpet shipped in 2007[1] , in addition to that which was previously installed, there is much cleaning to be done to maintain that fresh, new appearance. But there is still no consensus on when to clean.

Think about your current process of determining when to clean the carpet. Are you noticing unsightly stains or dull colors? Or is it based on an arbitrary schedule like once a year, quarterly, or during vacation holiday times of the year?

While a carpet's cleanliness is often determined simply by looking at it, soil that is invisible to the human eye is accumulating from the moment the carpet is installed. Waiting to clean until the soil is visible means that the dirt has reached an unacceptable level, putting the carpet at risk for early, and therefore costly, replacement.

The carpet is at risk because allowing soil to build up until it is unsightly severely hinders a cleaner's ability to recover its appearance. Heavily soiled carpet requires "restorative" deep cleaning to attempt to recover the carpet's original appearance. This method could lead to erratic or uneven appearance levels that degrade significantly over time. This type of 'deep restorative cleaning' is expensive, disruptive, and more often than not requires the use of more hazardous chemicals.

Objectively Measuring Appearance

In a laboratory test conducted by Cleaning Research International, a spectrophotometer was used to determine the effectiveness of cleaning by measuring the change in lightness of a white carpet. A spectrophotometer is a color measuring instrument that uses numerical color data to accurately communicate colors and color differences.[2]

Using the value "L" to describe the lightness of the carpet, numerical values are associated with the carpet's appearance by its ability to reflect light. In figure 1, there are 20 soiling cycles that were recorded. Each of these "soiling cycles" represents approximately 10,000 footsteps on the carpet. The numerical value for each soiling cycle reflects the carpet's appearance at that time, with higher numbers exhibiting that the carpet's appearance is darker, or has more soil present. The closer to zero the number is, the cleaner the carpet.

The carpet's appearance began at 17.7 after the first soiling cycle, and that number increases over time. At the end of each cycle, the carpet was vacuumed. By the 20th cycle, or after 200,000

SOILING CYCLE	VACUUMED ONLY (ΔL)
1	17.7
2	23.6
3	26.9
4	30.8
5	31.5
6	31.2
7	31.6
8	32.2
9	33.6
10	34.9
11	34.5
12	34.6
13	35.1
14	35.4
15	36.2
16	35.8
17	35.4
18	36.5
19	35.2
20	35.5
Extracted	27.3

Fig. 1

1 *Carpet & Rug Institute.* <www.carpet-rug.org>

2 *Precise Color Communication*. Osaka: Konica Minolta Sensing Inc., 2007.

footsteps, the carpet's appearance degraded to a value of 35.5.

Now, consider the previous statement that "This method (of 'restorative' deep cleaning) could lead to erratic or uneven appearance levels that degrade significantly over time." It is obvious that if this test carpet was installed in a facility, the new "clean" after a wet extraction would be 27.3, not the original value of 17.7. After more soiling occurs over time, the next deep cleaning would attempt to recover the carpet's appearance to a value as close to 27.3 as possible. The process would repeat over and over again until the carpet simply looked so poor that it had to be replaced. The following graph illustrates this degradation resulting from these lower "restore" points.

Fig. 2

Much research has been done leading to the development of the Carpet Appearance Management System, a patented program owned by R.E. Whittaker Company. This system can determine soiling levels with precision and objectiveness rather than estimating with the eye. Using a Tristimulus Colorimeter measurement device by Konica Minolta, it is possible to measure the change in color of any facility's carpet.

Not only does this system allow for research in determining generalities relating to carpet maintenance, but it can also be used on site to assist in the creation of a proper maintenance plan specific to any facility.

One of the differences between this system and the previous test by Cleaning Research International is that the entire color spectrum is measured to ensure accuracy on multi-colored carpet. This addition of "chromaticity" into the measurements introduces the values "a" and "b," resulting in color space values:
L*a*b*

When measuring the appearance of a facility's carpet, the chosen areas are compared against a target set of L*a*b* values. This target may be either attic stock or the cleanest, least trafficked area of the building. The result of these measurements comparing target to sample is described as ΔE, or the change in color space.

Objective soil measurements reveal that carpets need cleaning before ΔE equals 3.

In other words, after the measurements of a desired appearance are obtained, measure another area of interest. If, for example, the result of these measurements is 2.3ΔE, the carpet should be cleaned soon, if not immediately.

This practice is especially helpful when follow-up measurements are taken. If, in three weeks after cleaning, the carpet has reached a ΔE of between 1.5 and 3.0 again, it becomes apparent that that area of carpet needs to be cleaned every three weeks.

All of this scientific research lays the groundwork for the general carpet maintenance concepts to follow.

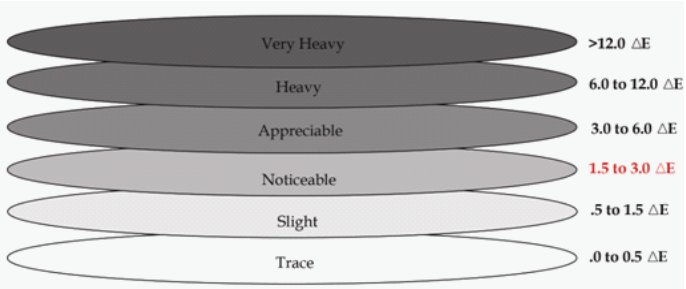

Fig. 3

Applying what we have learned about degrading carpet appearance, an "interim" method of maintenance was put to the test to compare appearance results. This test utilized the Whittaker SmartCare® Carpet System, so results may vary based on product selection and effectiveness.

Figure 4 introduces a third column to the soil measurement test in which interim maintenance using SmartCare® is performed every fifth soiling cycle.

There is a notable difference in the amount of soil present after interim cleaning is performed. In the case of the sample which was vacuumed only, this change continues to worsen until a plateau is reached which is an equilibrium between the color of the soil and the color of the carpet. However, in the case of the carpet subjected to interim cleaning, each subsequent clean restores the carpet to a value around that obtained after a single soiling.

Furthermore, after 'restoration cleaning' using hot water extraction equipment, the recovery of the carpet regularly maintained with the SmartCare® system is significantly better than that which does not have the benefit of interim maintenance.

In comparing these two methods of cleaning carpet, it is easy to see which one will maximize a carpet investment.

SOILING CYCLE	VACUUMED ONLY (ΔL)	WITH INTERIM CLEANING (ΔL)
1	17.7	17.7
2	23.6	23.6
3	26.9	26.9
4	30.8	30.8
5	31.5	18.6
6	31.2	24.3
7	31.6	26.9
8	32.2	28.3
9	33.6	30.4
10	34.9	19.9
11	34.5	24.8
12	34.6	28
13	35.1	29.8
14	35.4	31.4
15	36.2	19.5
16	35.8	23.1
17	35.4	25.9
18	36.5	27.9
19	35.2	30.6
20	35.5	20.1
Extracted	27.3	11.2

Fig. 4

A Comprehensive Plan

A proper maintenance plan aims to maintain the appearance of the carpet at an acceptable level to minimize the risk of early replacement.

Deciding when to clean should be based on levels of foot traffic and weather conditions. Some areas, such as upper level offices, will not need to be cleaned as frequently as main lobbies on the ground floor. Therefore, one set frequency may not be the solution for an entire facility. Rather, a maintenance plan with varying levels should be implemented.

This is important for multiple reasons. A correct frequency will not only make sure that your carpet is being cleaned frequently enough, but it can also determine if cleaning is too frequent, which leads to wasting product, water, electric ity and subsequently, money.

There are four cornerstones of a comprehensive maintenance plan that should be utilized to maximize efficiency and are acknowledged by many major carpet manufacturers in their product care manuals. They are:

1. Preventative Maintenance
Stop dirt from entering the building with well placed entrance mats that trap soil and absorb moisture.

2. Daily Maintenance
Schedule vacuuming and utilize a spotting kit to remove spots before they become stains.

3. Interim Maintenance
Establish minimum cleaning frequencies using low-moisture and pile lifting to retain fresh carpet appearance.

4. Restorative Maintenance
Perform scheduled periodic deep cleaning using high performance extraction.

Using Proper Products

One of the important issues to consider is that simply altering the frequency of an existing cleaning program will not necessarily yield better results. There are several factors that could hinder the recovery of the carpet's appearance regardless of frequency.

It is important to know what the chemical is like that is going into the carpet. One way to test a chemical is to place a couple drops of undiluted solution into a petri dish and allow it to dry over night. Consider the color and texture of the material when it is dry. Even if it may appear to clean the carpeting at first, some chemistry could have adverse effects on the color of the carpet. Try scraping the chemical off of the dish and see what happens. Does it flake like crystals and remove easily? Or can a fingerprint be pressed into its sticky residue? If it is the latter, imagine what happens when dirt is introduced to a carpet bearing that stickiness.

The chemicals that crystallize are "encapsulation" products, which help eliminate the common carpet cleaning problems relating to reappearing stains. Originated in the 1980's as an alternative to the reactive and disruptive wet extraction method of cleaning, this method was chosen for the cleaning tests in this study because embedded soil can be released without harming carpet fibers or leaving the sticky residues that accelerate re-soiling. Only a small amount of water is required during interim maintenance, which eliminates facility disruption and carpet damage associated with over-wetting. It effectively combines mill recommended pile-lifting and interim cleaning into one step, saving time and labor costs. Low-moisture cleaning reduces friction and any fiber distortion that can be caused by dry agitation. A twin-cylindrical brush machine performs both applications, reducing the need for a separate specialty machine.

In-Field Application

In a 400+ building school district in Nevada, the carpet's appearance had degraded so significantly that administrators wanted to replace it after only nine years. With the carpet's warranty listed at 25 years, such a significantly shortened lifespan would be costly. Utilizing the Carpet Appearance Management System, the school was able to identify a target value of appearance and determine whether soiled areas could be restored to, and maintained at, that satisfactory level.

For several months, the carpet was maintained with Whittaker's SmartCare® Carpet System, and measurements followed. With such a drastic improvement in appearance by the end of the program, the school district decided against replacement and instead instituted a proper maintenance plan. A subsequent study revealed that extending the life of the carpet would save $53,250 of premature replacement cost over five years based on 49,500 square feet of carpet.

Savings & Carpet Life Extension

Planning and implementing a scheduled maintenance program protects your capital investment and effectively contains maintenance costs.

Properly maintained carpet enhances facility appearance, contributes to a professional image, and protects the capital investment through extended product life cycles that lower overall cost.

As evidenced in the Nevada school district example, savings can be significant. Comparing a $53,250 savings to a chemical and machine startup cost of under $4,000 shows the importance of proper carpet maintenance.

Not everyone will have the time or budget to implement a Carpet Appearance Management System study in their facility in order to create a proper maintenance plan, but using the concepts above, it is possible to maintain a high appearance and maximize the life of your carpet investment.

If you have questions or would like to learn more about using Whittaker's product offering for your carpet maintenance, please visit www.whittakersystem.com or call (800) 422-7686.

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