HTETCO Carpet Flooring

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SECTION 1: INTRODUCTION

The purpose of this paper is to provide the reader enough information for a general understanding of how to prepare an estimate of the construction costs associated with supplying and installing carpet flooring. The reader should be able to use this guide as a reference for educational purposes only, or to gain awareness of a typical carpet flooring estimate. The scope will focus on the main types of carpeting and commonly used accessories, limited to application as a floor finish over commonly found substrates. The principles described here have been prepared through research, experience, and industry-accepted practices.

The paper is structured to begin with an introduction of the system, including relevant CSI Divisions. The following section expands on the details of carpeting systems, their pertinence to estimators, and how they’re quantified. Section 3 covers specific risks to be cognizant of when evaluating the carpet scope. Sections 4-7 provide an example floor plan and estimate worksheet to guide the reader through the estimating process, as well as some rules of thumb to validate a carpet estimate.

Brief Description of Subject Matter

Carpet is a floor covering system commonly used in many types of buildings, primarily in residential and commercial, but can be seen in almost every construction market sector. Its function can serve to provide comfort, acoustics, aesthetics, and/or safety. It is manufactured in a variety of fiber types and formations composing the top layer, with multiple rigid backing layers. A cushion or pad is often placed underneath. It is usually affixed to its subsurface with chemical or mechanical methods.

SECTION 2: TYPES & METHODS OF MEASUREMENT

This section will provide a brief overview of the variations in carpet material specifications that may be encountered, including related accessories and other commonly used products required for a complete install. The project’s specifications are important in order to ascertain the correct carpeting type, as this has the greatest impact on cost. The method of quantity surveying each item for the estimator will also be presented.

Broadloom vs. Modular

The two most common types of carpeting are sheet (broadloom) and tile (modular). Both are measured in square yards (SY) and are quantified from the centerline of walls. Broadloom carpet is manufactured in 6’ – 15’ wide rolls, and requires a cut-to-fit install, with seaming at adjoining edges. Broadloom carpet is most commonly secured to the subfloor with adhesives or tack strips. Adhesives are typically hand troweled, sprayed, or rolled underneath the entire subflooring area. Tack strips can be used at edges of walls or other vertical abutments for tensioned/stretch-in applications. Because of the labor required for seaming and cumbersome handling, broadloom installations are typically more expensive. More waste is also inevitable with broadloom installs. Carpet tiles are manufactured in roughly 20” squares and usually installed with tape or adhesives. The smaller size and ease of handling allows for lower labor costs and faster scheduling. The installation also generally requires less skill than broadloom. The location of each carpet type is important to note, as each has a more suitable application depending on the building and room types.

Fibers

Perhaps the most important determinant of the cost of the carpet is the pile fiber. There are a wide variety of synthetics that dominate the market, and each has its own unique performance characteristics. The fiber types that are commonly in production are as follows:

• Wool – an organic material, wool sets the highest standards for performance and appearance. Its market prevalence has declined over time, due to the rise of synthetics, and is now the least produced and most expensive carpet fiber type
• Nylon – a synthetic material, this is the most commonly used and manufactured fiber type, it has superior wear characteristics and moisture resistance, and also offers the most economical advantage
Integral colors and patterns are also an important factor in the cost evaluation of a carpeting system. Though the color may not always merit an estimator’s observation, differentiation should be considered to custom graphics (such as a sports team logo) or unique borders or patterns (such as a repeating pattern), which can add a potentially significant premium to the material and labor costs. RS Means, for instance, suggests an 18% labor increase for sheet carpeting with patterns.

**Pile**

There are also variations in the fabric construction, or how the fibers are composed (referred to as the pile). A tufted carpet consists of injecting the pile fabric into the backing. It is the most commonly found method for broadloom carpeting, and is the most economical. Bonded carpet is produced with chemical adhesion and is most often used for modular carpeting. Woven carpets can consist of multiple fabrics and with different integral colors, rather than a synthetic printing. Because the woven process is more time consuming, this will be the most expensive fabric construction. There are also other variations such as knitted and needle-punched that are less common in commercial applications.

**Face Weight**

Another key metric to evaluate the cost of carpeting is the face weight, or pile density, and is expressed as ounces per square yard (oz. /sq. yd.). This is a measurement of the density of the pile and is often correlated with traffic type (i.e. light, medium, and heavy). Only the pile is considered in this measurement, not the weight of the backing or other materials. Generally, the greater the density, the higher the material cost, though that is not always the case. When comparing the pile density measurements of one carpet product to another, an evaluation of the fibers and fabric construction type must also be considered, as the pile density alone does not represent an accurate “apples to apples” comparison.

**Cushion**

Broadloom carpeting will often specify a particular cushion, which can be integrated into the backing or as a separate component. There are a handful of cushions, also measured in SY and by density (oz. /sq. yd.). Cushions are found in a variety of material types: fiber (animal hair, synthetics, and recycled), rubber, and foam (prime polyurethane, bonded polyurethane, and mechanically frothed). Each of these types have varying degrees of cost, with fibrous pads as the most expensive. Cushions are typically installed with adhesives. A double glued-down installation can sometimes be specified, requiring the cushion to be adhered to the substrate, and the carpet to be adhered to the top of the cushion. The double glued-down installation will result in higher costs. Modular tiles do not typically require a separate cushion. Most tile backings will have a “hard back” (made from PVC or an amorphous resin) or a “cushioned back” (polyurethane-based).

**Seams**

Seaming for broadloom carpeting can be achieved via several methods; applying adhesives, tape, hot-melt type bonding strips, or hand sewing. Seams can be measured by the lineal footage (LF). For most general contracting and construction management estimating firms, the seams are not typically quantified. The carpeting subcontractor however, must carefully determine the layout to minimize seam counts in order to reduce labor costs and material waste. The lay pattern and location of seams are also an important factor, and a good installer will know to not place seams in high-traffic areas. This information will typically be conveyed in a shop drawing or submittal package.

**Thresholds, Trim, and Accessories**

There a variety of accessories and materials used to facilitate a professional installation of a finished surface that gives the appearance of a clean and workmanlike finish. These items are available in a multitude of materials and styles. It may be important to note the specification requirements for each room. When adjoining different flooring material edges or thicknesses, the use of a transition strip is standard. Thresholds are also deployed at entrances and openings. These can be quantified on an each (EA) basis (depending on the opening size), or on a LF basis. Wall base is also commonly incorporated into the carpeting subcontractor’s scope. Renovation projects may only specify the use of a shoe, a smaller piece of trim that is fastened to the wall base, or to not disturb the existing wall base. Commercial projects often specify a rubber or vinyl wall base, residential applications often use a wood or MDF base. Quantities are calculated from the carpet perimeter along the wall on a LF basis.

There are a few miscellaneous items to consider if a complete detailed estimate is necessary. Fasteners or adhesives for the tack strips, wall base, thresholds, and other trim are required to secure in place. Adhesives for the carpet, pad, and seams may also be necessary, and each may specify a different agent or compound. These items will vary depending on the carpet and installation type, but are necessary to complete the job. Depending on the level of detail, these items may not be included in the estimate, or would otherwise be included within the cost of the carpeting items.
Specialties
Another increasingly common specialty are carpets with electro-static dissipative (ESD) properties. These are constructed with integral conducting materials in the fibers and backing, and installed with specialty adhesives and accessories. The floor is then tested to meet performance requirements. This environment is desirable in critical, dispatch, and sensitive electronic facilities. This system is more expensive than a typical carpeting system.

SECTION 3: SPECIFIC FACTORS TO CONSIDER & SPECIAL RISK CONSIDERATIONS

Carpeting is subjected to a variety of factors that affect quantities and pricing. General considerations must be in order that are associated with the inherent risk of construction, as well as a handful of carpet-specific considerations. Some of these are briefly noted below, though not all encompassing, followed by additional expanded mentions.

- The available skilled labor in a particular geographic region has an effect on the professional quality of installation. This is most applicable to broadloom carpeting, as a greater degree of skill is required for an exceptional finish than of tile carpeting.
- Building configuration, or the shape of the floor layout may require more or less effort or material waste
- Adjacent or interfacing flooring, or if attempting to match an existing carpet
- Low emissions material requirements for LEED projects
- Subfloor radiant heating will require greater attention to coordination
- Economies of scale based on quantities will have an effect on costs – larger quantities can be purchased in bulk at discounted material & shipping rates, as well as improved labor efficiencies
- Inclusion of any repairs to existing carpet
- Local building codes or regulations
- Building access and egress for installation

Staging
The vast majority (70%) of carpet that is manufactured in the United States originates from Dalton, Georgia (the city is referred to as “The Carpet Capital of the World”). Therefore shipping and transportation costs will reflect this distance. Current market oil/fuel costs may also have an impact, as well as seasonal or weather delays.

Carpet materials can be staged on-site and are not typically subjected to costs for off-site storage requirements. Storage and handling requirements prohibit stacking rolls at any time. Some manufacturers may even specify the carpeting to ‘relax’ for a 1-2 day period to allow the backing materials to release any curling or tension prior to installation. It is beneficial to acclimate the materials to the conditioned space to minimize any thermal expansion/contraction.

Schedule
Finish flooring is typically one of the final components installed on a new build or renovation project – this is to ensure damage or heavy wear is not caused from other working trades. HVAC systems must also be installed and operational because of the temperature sensitivity of carpeting materials. The slab must be sufficiently cured and dry. If the construction schedule has not been met pertaining to the carpeting scope, this could delay downstream activities such as fixtures, furnishings, equipment, or substantial completion. Cost impacts of delays could include additional labor to accelerate the schedule or risks of liquidated damages. Seasonal effects include an uptick of construction during warmer months, and may have an impact on material and labor availabilities.

Subflooring & Existing Conditions
The general contractor is typically responsible for the subflooring conditions and providing necessary testing of the substrate. A concrete slab-on-grade subfloor will demand more preparation. A moisture vapor emission rate test (MVER), relative humidity test (RH), and alkaline/PH testing are all commonly required for a complete professional install, and must be appropriately documented in order to not risk voiding the manufacturer’s warranty. The moisture barrier must also be sufficient to avoid any below grade infiltration, and additional costs may be necessary to increase this barrier to a thicker profile. If concerns for bonding compatibility are warranted, a bond test can be performed. Priming agents can also be used to aid in certain situations.
Cracks, holes, irregularities, and greatly uneven sub-surfaces must be repaired prior to install. Foreign particles or debris must be cleaned. Carpeting is more forgiving for a wider range of tolerances of sub-surfaces that are out of level or damaged, especially with a cushion. If extensive patching or leveling is necessary, it may be beneficial to consult the carpet manufacturer’s literature for compatibility of patching or leveling compounds with intended carpet adhesives, or of cure-time delays. If wood is the substrate, any chemical treatments must be compatible, as well as any required remediation of mold, mildew, or other deleterious materials. Other substrate materials must be compatible and suitable for a secure installation.

For renovation projects, any removal of existing flooring, subflooring, trim, mastic, or adhesives must first be investigated for asbestos containing materials, or any other hazardous substances. If a hazard is discovered, a cost-saving opportunity is to consider installing the carpeting system over the existing flooring. Hauling or disposal must also be considered, and to include the cost for any trucking equipment or dump fees.

Moving furniture is also common and can add labor costs and schedule delays if not appropriately accounted for. A solution to minimize this task is a partial replacement. A partial replacement can be accomplished by “jacking” or lifting the furniture and sliding modular carpet tiles in without relocating furniture or disconnecting/reconnecting utilities. This is a common practice for replacements in office environments.

Miscellaneous
Some projects may require an Operations & Maintenance (O&M) program. Costs for this often include a quantity of additional carpet materials to be left on-site with the owner (typically 1-5%), in the event of future replacements. This cost should be considered when reviewing the project specifications and included in the material costs. Educating the owner of the manufacturer’s recommended O&M procedures is common, and may also include additional staff or labor costs.

SECTION 4: OVERVIEW OF COSTS + MARK-UPS

This section will summarize the overall costs in a carpeting estimate. For demonstration purposes, a sample estimate of a custom office carpet job is attached. The example requires removal and replacement of existing carpeting and trim. Refer to Section 6 for review of the floor plan, quantity takeoff markups have been overlaid from the takeoff software. Section 7 shows the estimate worksheet.

Labor
The type of carpet and installation method generally dictates the labor productivity rates, which drives the majority of labor costs. A typical labor crew consists of 1-2 installers; a lead installer and a helper if needed. Crews with more installers will typically work in separate areas or on different tasks to speed up the project installation. Generally, flooring subcontractors are capable of installing all types of flooring and do not often specialize solely on carpet.

In the example estimate worksheet (Section 7), labor hours are calculated by the productivity rates referenced from RSMeans. Labor hour rates will vary per estimator/firm and are influenced primarily by skill level and efficiencies. In this example, the productivity rate for sheet carpet with a separate cushion is 24 hours for 150 SY. Roughly the same area can be completed in 16 hours for tile carpet without a separate cushion. If historical productivity rates are unavailable, a conservative rule of thumb is to consider how long it would take, in 4-8 hour increments, to complete the activity independently with a helper. In this example, roughly 54 hours is required for project completion. Pricing for labor costs can also vary by factors such as geographical area or labor burdens. The national average pricing from RSMeans is shown in the example (average of union wages from 30 major U.S. cities), and includes subcontractor burden and markups (costs shown here can be adjusted to a specific city using the RSMeans City Cost Index or Location Factors, if desired).

Equipment
The use of equipment is generally not required for carpet installation. Larger jobs with many pallets of material may benefit from the use of a small forklift for staging or handling, but can generally be transported with the use of pallet jacks, dollies, carts, or by hand. Carpet is installed with mostly hand tools. The more specialized and costly hand tools include seam sealing devices and power stretchers. These can be purchased or even rented if the manufacturer requires these installation methods. Industrial vacuums can be used for clean-up and carpet-cleaning equipment can be used for more demanding soil levels. Trucks and trailers are necessary for hauling away demolished flooring or debris, as well as delivering the materials if this is not provided by the supplier.
Material
Determining material costs will require a review of the project specifications in combination with any keynotes or finish schedules. Take note of the important material characteristics as described in Section 2 above, as well as the building space’s function. Two types of carpet are shown to be installed in the example estimate. Accompanying items include transition strips, vinyl base replacement, leveling the subfloor at the carpet tile areas, and demolition of the existing carpeting. After performing a quantity takeoff, the carpeting requirements will need to be relayed to a local supplier for pricing, or referenced in a costing database or manual. The costs shown in this example are referenced from RSMeans and include subcontractor markups. Taxes are not reflected in the example values, but should be considered for application to the specified geographic area.

Waste allowances are also necessary to ensure complete coverage and a professional installation. Some waste is unavoidable, such as defects, layout challenges or to minimize unwanted patterns. Some waste can be controlled, such as damage or from the result of re-work. The estimate example has a waste allowance of 5% of the takeoff quantities included for the flooring and wall base.

Indirect Costs & Markups
The markups and indirect costs in the example are based on a percentage, representative of the typical costs for each category. The estimator should be familiar with what these cost allocations represent. These values are typically calculated on a percentage basis or individually quantified and priced, and will vary per estimator. The percentages shown in this example are derived from Sierra West’s guidelines. Escalation has been forecasted for a two-month delayed start date.

SECTION 5: RATIOS & ANALYSIS
This section will briefly cover some guidelines to ensure an estimate is accurate and reflects the project scope. Some rules of thumb can be used to verify quantities, such as calculating the total floor finish quantities in comparison to the building or project SF area. The ceiling area, if shown in the project drawings, should also compare similarly. One common error is misappropriating the carpet quantities as SF instead of SY, which can result in a significant discrepancy. When soliciting quotes from subcontractors or suppliers, self-performing a quantity takeoff is highly recommended. Square foot costs should also be analyzed, and can be compared to other finish systems to check if prices are within reason.

Another common problem is misinterpreting drawings that may have a design error in the finish schedule, floor plan, legend, or other keys/notes. Finish schedules seldom align with the drawings and specifications. The specifications may also indicate a different product than is identified in the drawings. For example, the project drawings may have inadvertently illustrated carpeting in a mechanical room, but that realistically isn’t feasible. Attempting to guess what the architect’s intent can prove dangerous, and it is always wise to seek clarification. Above all, a critical component to any estimating department’s quality program is a formal review process. An estimator that is even unfamiliar with the project can highlight items that appear out of range from standard quantities, pricing, scope gaps, or other estimating procedures.
SECTION 6: SAMPLE PROJECT DRAWINGS

270 - Vinyl base - Q1 323 LF
273 - Carpet, 28 oz. - Q1 88 SY
438 - Carpet tile, 26 oz. - Q1 47 SY
439 - Transitions - Q1 28 LF

KEYNOTES:
1. Remove existing carpet, padding, and adhesives. Take strips down to concrete slab on grade. Install new carpeting materials accordingly:
   CPT 1 - Carpet tile, 26oz, Nylon Level-loop
   CPT 2 - Sheet carpet, 28oz, Nylon Level-loop
2. Remove existing baseboards. Install new vinyl base.
   Transition strips to be installed at all floor transitions
   Existing restrooms to remain in place

SCALE: 1/8" = 1'-0"
DATE: 04/02/2021
FLOOR PLAN
A2
## ESTIMATE WORKSHEET

**AMERICAN SOCIETY OF PROFESSIONAL ESTIMATORS**

**PROJECT:** HOW TO ESTIMATE THE COST OF CARPETING  
**Bldg. Office**

**Phase:** 100% Construction Document  
**Project SF:** 1,275

**Start Date:** June 13, 2021  
**Estimate Date:** April 13, 2021

**By:** James Padilla

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**Subtotal Hard Costs:** $11,687

**Contingency**  
**Estimating Contingency:** 3.00%  
**Contingency Cost:** $351

**Subtotal Construction Costs:** $12,038

**Mark-ups**

**General Conditions:** 15.00%  
**Overhead & Profit:** 12.00%  
**Insurance & Bonds:** 3.00%

**Subtotal Mark-ups:** $3,332

**Subtotal Construction Costs & Mark-ups:** $15,370

**Escalation**

**Escalation to MPOC (9% Annual) for 2 mo. 0.83%** $133

**Subtotal Construction Costs, Mark-ups & Escalation:** $16,103

**Total Construction Costs:** $16,103
SECTION 7: GLOSSARY & REFERENCES

Broadloom – carpet that is woven on a wide apparatus to make large sheets.

Modular – square tiled carpet.

MVER – Moisture Vapor Emissions Rate Test, measures moisture on the surface of the concrete slab.

pH – A scale to measure the of alkalinity or acidity.

Pile – the arrangement or texture of the upright surface fabric of a carpet.

Pile Weight – the average weight, in ounces, of pile yarn per square yard.

RH – Relative Humidity Test measures the moisture content within the concrete slab.

Seam – a line along which two pieces of fabric are joined together

Substrate – the underlying surface of flooring; usually concrete or plywood.

Tuft – a type of carpet pile. Made by mechanically stitching the fabric directly through its backing.

Woven – a type of carpet pile. Made by interlacing threads together on a loom.


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