

Carpet and Upholstery Care

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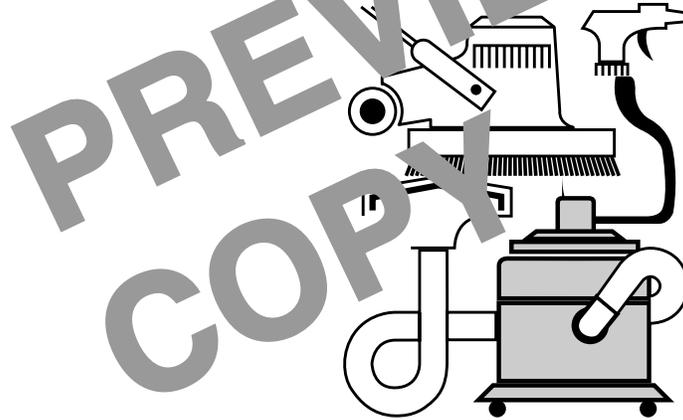
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CARPET AND UPHOLSTERY CARE

Lesson One

**Carpet Materials and
Construction**



TPC Training Systems

45501

Lesson

1

Carpet Materials and Construction

TOPICS

A Brief History of Carpet
 Definition of Carpets and Rugs
 Carpet Construction
 Pile Yarn Fibers
 Backing Yarn Fibers

Types of Carpets
 Carpet Padding
 Padding Materials
 Carpet Installation
 The Effect of Carpet Color

OBJECTIVES

After studying this Lesson, you should be able to...

- Name the different parts of a carpet and explain the function of each.
- Compare the natural and synthetic fibers used in carpet yarns, and list the advantages and disadvantages of each.
- Describe the construction of the major types of carpet.
- Explain why padding or cushioning is used under carpet, and describe the different padding materials, both natural and synthetic.
- Explain how problems can develop in a carpet that is not installed correctly.

KEY TECHNICAL TERMS

Pile 1.05 upright fibers that make up the visible top layer of a carpet fabric; also called *nap*

Face 1.07 top surface of pile yarns on a carpet

Tufts 1.11 individual pile loops or yarn strands that make up the pile of a carpet

Polypropylene 1.23 strong, moisture-resistant thermoplastic resin used in the production of some synthetic fibers

Warp 1.30 backing yarns extending lengthwise in a woven carpet

Weft 1.30 backing yarns running perpendicular to the lengthwise yarns in a woven carpet; also called *woof*

Scrim 1.34 sheet of fabric backing used in the construction of needlepunched carpet

Flocking 1.44 carpet-manufacturing process in which short fibers are adhered to a backing material by electricity, beater bars, or spraying

Carpet is a fabric covering for floors and stairs that has been manufactured for thousands of years. Until recently, carpet was considered a luxury item, but today, it can be found in all kinds of buildings. *Rugs* are included in this Unit's definition of carpet because their construction and care are the same.

Carpet fabrics can be made from several natural materials, like wool and cotton, and many synthetic materials, like polyester and nylon. Some carpet fabrics are a combination of both types of material. Each kind of carpet material has advantages and disadvantages.

Carpet construction methods are as varied as the materials used to make them, but most carpets are constructed to have a pile face, a back, and padding. In a single style of carpet, each of these components might be made with different materials.

Before you can maintain your carpet correctly, you must be able to identify what materials it is made of and what construction method was used to manufacture it. Carpets made from different fibers and using different construction methods are often maintained differently. If you use the wrong cleaning procedure or chemical on a carpet, you can ruin it. In this Lesson, you will learn the various types of carpet yarn fibers, backs, pads, construction methods, and installation methods.

Later Lessons in this Unit explain how to maintain carpet and solve specific carpet care problems. Upholstery fabric care is also covered in this Unit.

A Brief History of Carpet

1.01 The manufacture of carpet started almost 2000 years ago when the first carpets were woven of animal hair. Vegetable fibers—grass, reeds, and the leaves of various trees—also were used to make early carpets in different parts of the world. Before 1800, the people of Persia (now Iran) were producing their famous Oriental rugs. The care and handwork they put into these rugs gave them such great wearing quality that many of them are still in use. In the mid-1800s, European carpet-making began, using crude wooden looms. The invention of the power loom in the late 1860s allowed manufacturers in the United States to start making their own carpets.

1.02 Until recently, carpets were considered a luxury. No other type of floor covering could give its owner all the benefits that carpet could—good looks, comfort, warmth, softness underfoot, and a nonslip surface. The invention of synthetic (man-made) fibers led to the development of indoor/outdoor carpeting. Today, you find carpeting not only

on porches and terraces, but in hotels, restaurants, hospitals, schools, office buildings—and even on boats and boat docks.

Definition of Carpets and Rugs

1.03 Carpets and rugs are simply textile (woven cloth) fabrics for covering floors and stairs. They are made from a great variety of materials, and are produced in many different ways. Rugs and carpets differ only in size and edge finish. A *rug* usually comes in a given, standard size, and exposes bare flooring around its edges. Therefore, rugs usually are bound or “finished off” around the edges, as shown in Fig. 1-1 on the following page. *Carpet* normally is cut in long lengths from a roll of standard width. As shown in Fig. 1-2 on the following page, its edges are not bound. Unbound carpet edges are joined to other carpet pieces with seams, and the outer edges are anchored to the floor along the baseboard when laid wall-to-wall. The word “carpet” will refer to both carpets and rugs in this Unit, because the construction and care of both are the same.

Fig. 1-1. Rug edges are bound or “finished off”



Fig. 1-2. Carpet edges are not bound



1.04 Over the years, the cost of installing and maintaining carpet has been reduced so that it is now about the same as the cost of installing and maintaining resilient flooring. In fact, compared to some resilient flooring, carpet is not as hard to maintain and keep clean. Before you clean any carpet, you must know what materials go into it, and how it is made.

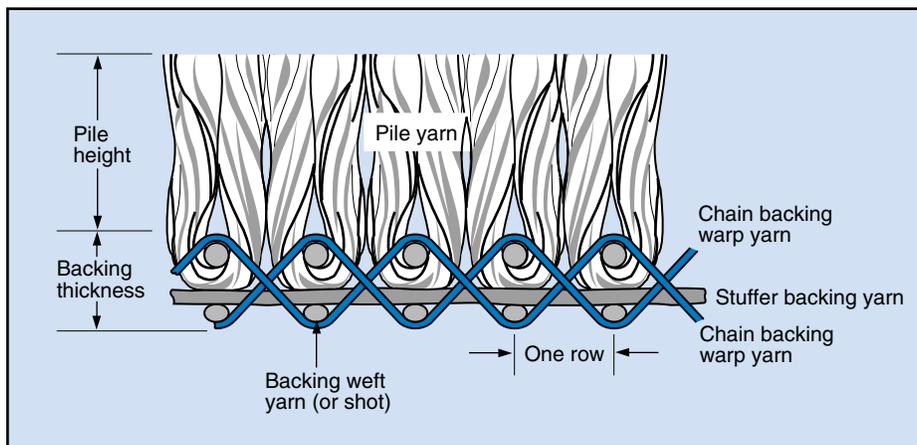
Carpet Construction

1.05 Carpets have a texture or weave that differs from most fabric and cloth coverings. The *pile* or *nap* of the carpet is made from either *natural* fibers (like wool or cotton) or *synthetic* fibers (like nylon or polyester). The fibers are spun or twisted into yarn, and this yarn is woven, tufted, knitted, or needlepunched into a pile, as described later in this Lesson.

1.06 The pile is attached to a *back* that holds it together to form the carpet, as shown in Fig. 1-3. The back is made from either a natural fiber (like jute, which also is used in making ropes), or a synthetic fiber (like polypropylene). These fibers also are twisted into heavy yarns. Both jute and polypropylene are strong materials, but jute absorbs water, while polypropylene does not. It is important to know whether or not a particular carpet backing absorbs water.

1.07 To a custodian, the most important parts of a carpet are the pile yarns and the backing yarns. As shown in Fig. 1-3, *pile yarns* are the upright (vertical) yarns that form the surface of the carpet on which people walk. The top surface of the pile yarns is called the *face*. *Backing yarns* make up the bottom layer of the carpet that holds the pile together. You cannot see

Fig. 1-3. Cross-section of carpeting showing construction details



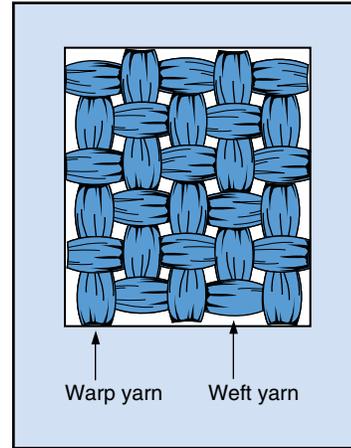
them. In certain types of carpet construction that you will learn about later in this Lesson, the pile yarns and the backing yarns are woven or knitted together. In other types of carpets, the pile is stitched or tufted into a separate back that is made from woven yarn or matted fibers, as shown in Fig. 1-4.

1.08 Depending on the carpet texture and desired pattern, the pile face is cut, looped, or cut and looped to form a pattern, as shown in Fig. 1-5. Cut yarn looks like a single yarn cut off like a blade of grass. Both ends of a looped yarn are attached to the backing so that no loose ends show on the pile face.

1.09 The pile face receives the traffic wear and soil. The patterns, textures, and colors of the pile face hide wear and soil to varying degrees. The carpet construction method—which you will learn about later in this Lesson—determines pattern and texture. A *low-level loop pile face* is designed for heavy traffic areas. Sometimes a portion of the loops are cut to make a textured surface. Uncut loop pile does not shed fibers. It is dense, and resists soil better than cut pile. A *cut pile face* is beautiful but crushes very easily. It makes the carpet appear to change color. This apparent color change is known as *shading*. Cut pile carpet also sheds fibers.

1.10 A *shag face* has either a looped or cut pile 1 in. or more in length. Its ragged appearance helps to hide dirt and soil. A *frieze* or *twist face* is much like a shag, except that the yarns are twisted and are shorter than a regular shag. A *multilevel loop pile face* creates various textured patterns. A multilevel loop pile face

Fig. 1-4. Prewoven backings in plain weave



with *random shearing* produces sculptured (carved) patterns.

1.11 The *pile density* of a carpet greatly affects how well the carpet wears and keeps its good looks. The number of *tufts* (pile loops or yarn strands) per square inch and the weight of the yarn both affect pile density. The more tightly the yarns are packed together and the heavier they are, the more support they give each other. Soil will not sink in as deeply in a dense pile carpet, making the soil easier for you to remove with a vacuum cleaner.

Pile Yarn Fibers

1.12 As you learned in paragraph 1.05, pile yarns, illustrated in Fig. 1-3, can be made from either syn-

Fig. 1-5. Various pile face patterns and textures

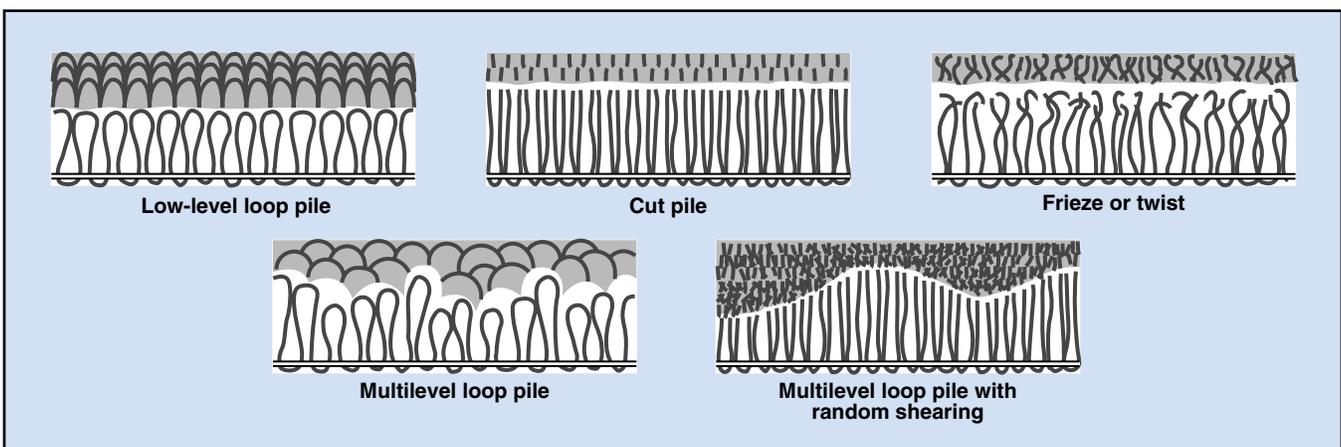


Table 1-1. Summary of fiber properties

Carpet fiber		Wear	Appearance	Resilience	Soil resistance	Cleanability	Spot resistance	Pilling	Static electricity buildup
Type	Material								
Natural	Wool	Good	Warm, soft, rich	Good	Good	Good	Fair	Some when new	Only in cold weather and dry climates
	Nylon	Excellent	Dull to lustrous	Poor to excellent	Good	Good	Good	Some with older fibers	Newer ones resist static
Synthetic	Acrylics	Good	Warm, soft, rich	Good	Good	Good	Very good	Some when new	Only in cold weather and dry climates
	Modacrylics	Fair to good	Soft, rich	Fair to good	Good	Good	Very good	No ¹	Resists static
	Polypropylene	Very good	Waxy feel, somewhat lustrous	Poor	Good	Good	Excellent	No	Rarely a problem
	Polyester	Good	Soft like wool, bright	Good	Good	Good	Excellent	Some when new	Only in cold weather and dry climates

¹ Fibers usually are blended.

thetic or natural fibers. The type of fiber in a carpet is very important. It greatly affects:

- how good the carpet looks
- how long the carpet lasts
- how difficult the carpet is to clean
- how often the carpet must be cleaned.

1.13 The pile fibers most often used in the carpets that are installed in public buildings include:

- wool (natural)
- nylon (synthetic)
- acrylic and/or modacrylic mixtures (synthetic)
- polypropylene (synthetic)
- polyester (synthetic)
- various blends of the above fibers.

1.14 Each of these fiber materials has both its strong and weak points, as shown in Table 1-1.

Certain manufacturers of synthetic fibers have found ways to increase the strong points and decrease the weak points of some synthetic fibers. Therefore, a particular fiber made by one company could be better or worse than the same fiber made by another company, which greatly complicates the cleaning of carpet.

1.15 *Wool* has been used in woven carpet for centuries. It is still very popular. It is a natural fiber that comes from sheep. Its outstanding feature is *resilience*, which simply means that the wool fiber springs back to its original shape quickly after being stepped on or crushed. Wool is also very strong and resists abrasion (wear). When these qualities are combined in the right construction, they make a good-looking carpet that lasts a long time if cared for properly.

1.16 However, wool stains more easily than synthetic fibers. It also absorbs water, which can result in mildew. Wool can become a problem if the carpet is exposed to a lot of wet soil. It can also cause problems if you must shampoo the carpet frequently. The main disadvantage of wool is that it is expensive.

1.17 *Nylon* is the fiber material most commonly used for carpet fibers. It is noted for its strength. It wears a very long time, and comes in many colors and

color combinations. Some nylon fibers hide soil very well. Nylon also resists stains.

1.18 The main disadvantages of nylon carpets are pilling and static electricity buildup. *Pilling* occurs in older nylon carpets when loose fibers tangle and form small balls, or “pills.” This problem has been almost eliminated by newer nylon yarns and better construction methods.

1.19 *Static electricity buildup* takes place in the bodies of people who walk on some carpets. For example, you know that when you touch a grounded light switch or metal surface, you sometimes get a “shock” as the static electricity discharges. This problem becomes worse in cold weather and dry climates. Static electricity can build up on all carpet fibers, but nylon presents the most severe problem.

1.20 Most nylon carpet manufacturers now insert special fibers or materials among the nylon fibers to help reduce this problem. Most newer nylon carpets now have this *antistatic* feature. However, if you are having trouble with static electricity buildup, you can spray an antistatic compound on the carpet to combat it. You must apply the compound after each time you shampoo the carpet. Because foot traffic gradually wears the compound off, you might have to treat busy areas more often.

1.21 *Acrylic* and *modacrylic* mixtures are also synthetic fibers. Acrylic fibers resist discoloration due to sunlight very well. For this reason, they often are used in outdoor carpet. Neither acrylics nor modacrylics are damaged by most acids. They also stand up well to many mild alkalies and other chemicals that damage wool. This quality allows you to use certain stain removers on acrylic carpet that you could not use on wool carpet.

1.22 Some of the earliest acrylic carpet fibers caught fire easily. But mixing acrylic fibers with modacrylic

fibers made the carpet less flammable. Today’s mixed fiber carpets are no more flammable than wool.

1.23 *Polypropylene* is one of the newest synthetic fibers. These fibers are very strong, and wear well. Polypropylene carpet usually does not build up static electricity. It also resists most common acids, alkalies, bleaches, and stains, and absorbs very little water. *Olefin* is the polypropylene fiber most widely used in carpet today.

1.24 Polypropylene fibers—like acrylics—are not affected by mold, mildew, or insects. They are widely used in indoor/outdoor carpet. But polypropylene fibers are not as resilient as many other carpet fibers. Also, they do not have as much luster (shine) as nylon.

1.25 *Polyester* fiber yarn is soft, rich-looking, and resists stains. Like polypropylene, however, it is not very resilient in some constructions. Also, it does not retain its texture as well as a nylon carpet does. Nylon and acrylics are now replacing polyester as carpet fibers.

1.26 Carpet manufacturers often blend or mix several different kinds of yarns in a pile to combine the best properties of each. For example, a carpet that is made of 69% acrylic yarn, 30% nylon yarn, and 1% static-control material has a good appearance (from the acrylic), good strength (from the nylon), and built-in static control. If the acrylic and nylon content were reduced and modacrylic yarn added, the carpet would be flame-retardant as well.

The Programmed Exercises on the next page will tell you how well you understand the material you have just read. Before starting the exercises, remove the Reveal Key from the back of the book. Read the instructions printed on the Reveal Key. Follow these instructions as you work through the Programmed Exercises.

10 Programmed Exercises

<p>1-1. The main difference between carpets and rugs is that the edges of rugs are _____.</p>	<p>1-1. BOUND or FINISHED OFF Ref: 1.03</p>
<p>1-2. The pile or nap of a carpet is made from natural or synthetic fibers that are twisted into _____.</p>	<p>1-2. YARN Ref: 1.05</p>
<p>1-3. To form a carpet, pile is attached to a(n) _____ that holds it together.</p>	<p>1-3. BACK Ref: 1.06</p>
<p>1-4. The main yarns that make up a carpet are the _____ yarn and the _____ yarn.</p>	<p>1-4. PILE; BACKING Ref: 1.07</p>
<p>1-5. Which resists soil better, cut pile or uncut loop pile?</p>	<p>1-5. UNCUT LOOP PILE Ref: 1.09</p>
<p>1-6. Looped or cut pile 1 in. or more in length is used in a(n) _____ face.</p>	<p>1-6. SHAG Ref: 1.10</p>
<p>1-7. The outstanding feature of wool carpet fibers is their _____.</p>	<p>1-7. RESILIENCE Ref: 1.15</p>
<p>1-8. Outdoor carpet does not discolor in sunlight because it contains _____ fibers.</p>	<p>1-8. ACRYLIC Ref: 1.21</p>

Backing Yarn Fibers

1.27 The back that holds the pile yarns together in a tufted carpet consists of a *primary* back and sometimes a *secondary* back. The primary back and the pile in many carpets are joined together as the carpet is made. Both backs consist of either woven yarn, as shown in Fig. 1-4, or fibers matted together.

1.28 The prewoven secondary back usually is laminated to the primary back with liquid rubber or latex. This lamination serves two purposes:

- It keeps the tufts from pulling out.
- It adds more strength to the carpet.

1.29 In a tufted carpet, the backing fibers are usually jute or polypropylene. In a woven carpet, they can be jute, cotton, nylon, or rayon. They can also be a mixture of natural and synthetic materials. A synthetic back is best for an area that gets a lot of wet traffic, or must be cleaned often. It will not discolor the pile yarns if the carpet gets wet. Also, synthetic backs do not mildew or shrink when wet.

1.30 The lengthwise backing yarns in a woven carpet are called the *warp*, and the crosswise ones are called the *weft*. *Stuffer warp* and *chain warp* fibers are used to add extra strength and weight to the backing in a woven carpet.

1.31 Be careful not to get natural fiber backing yarns too wet when you clean the carpet. If you must use a wet cleaning method on carpet that has a natural fiber back, test a small (25 ft²) sample area first to make sure that it can withstand wet cleaning.

Types of Carpets

1.32 Carpets can be classified by the different methods used in making them. The most common are:

- tufted
- needlepunched
- woven
- knitted
- flocked.

1.33 **Tufted carpet.** About 95% of today's carpets are made by tufting. *Tufted* carpet is used more than any other type in buildings and facilities. It comes in a wide variety of patterns and textures. The machine that constructs tufted carpet is like a giant computer-controlled sewing machine, usually 12 to 15 ft wide (standard carpet widths). It has hundreds of needles that push the pile yarn through the prewoven primary back sheet. As each needle pulls out, it forms a loop or *tuft* of pile that is held in place by the back sheet, as shown in Fig. 1-6. Then the carpet is coated with a latex compound that keeps the loops from pulling out of the carpet.

1.34 **Needlepunched carpet.** *Needlepunched* carpet (indoor/outdoor carpet is an example) is made up of loose fibers, not yarns. The carpet-making machine first combs the fibers, and then lays them out on a web form. A sheet of polypropylene back, called *scrim*, is placed over the first fiber layer, and a second layer of fibers is laid out on top of the back sheet. This loose "sandwich" moves to a needlepunching machine that uses hundreds of barbed needles to interlock the fibers with themselves, and to the polypropylene back sheet. After a third layer of fibers is laid out on top of the sandwich, it goes through a final needlepunching operation. Sometimes a secondary back of foam rubber or similar material is applied before the design is printed or embossed by another machine.

1.35 One layer of pile crushed down on another makes a rather hard carpet, with little or no pile height. But needlepunched carpet wears very well, and its

Fig. 1-6. Construction of tufted carpet

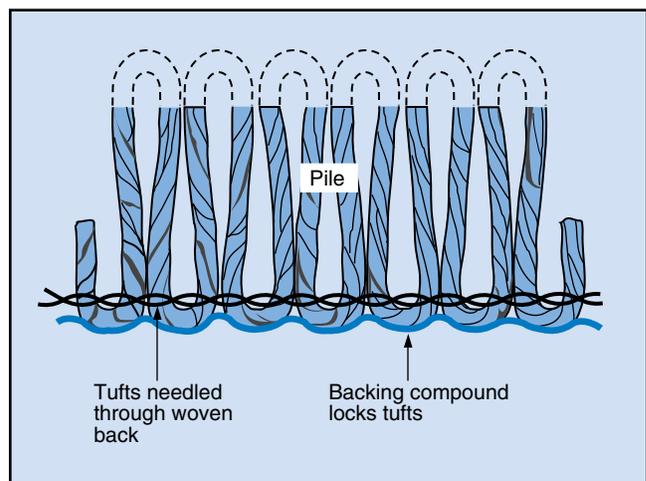


Fig. 1-7. Construction of velvet woven carpet

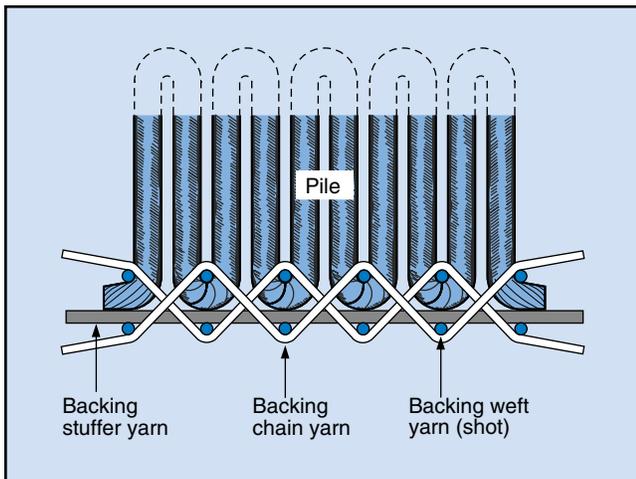
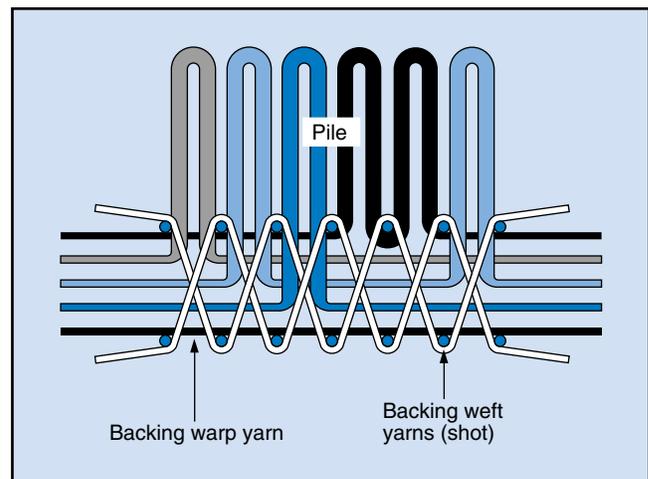


Fig. 1-8. Construction of Wilton woven carpet



color lasts. Because of these qualities, it is widely used in both industrial and institutional facilities. Needlepointed carpet for indoor use contains nylon, polypropylene, or acrylic fibers. Most outdoor carpet is made of polypropylene or acrylic fibers.

1.36 **Woven carpet.** The process of making woven carpet produces both the pile and back at the same time, and on the same loom (weaving machine). The three most common woven carpets are:

- velvet
- Wilton
- Axminster.

Manufacturers can modify each type of woven carpet to produce special patterns, textures, and properties.

1.37 *Velvet* woven carpets have the simplest construction, as illustrated in Fig. 1-7. They usually are woven on a loom from only one pile yarn, and therefore come mainly in solid colors. Two or more strands of different colors can be twisted together to give them a “tweed” or “salt and pepper” appearance, however. Velvet carpet pile yarns are woven either through the backing yarns, or interwoven with the backing yarns. To decrease skidding and give the carpet more weight, special compounds can be applied to the back. A top-quality velvet carpet has between 64 and 100 tufts per square inch. A medium-grade carpet has

50 to 80 tufts per square inch. And the lowest-priced carpet has only 43 to 49 tufts per square inch.

1.38 Velvet carpet comes in many surface textures, including loop pile, plush effect, tree bark effect, and a combined cut and uncut pile. A solid-colored velvet carpet shows dirt faster than a multicolored carpet does. Velvet carpet wears very well, and is suited to heavy traffic areas. It also resists snags and pulls. Some velvet weave carpets have backing yarns made from natural materials. Be careful not to get such a carpet too wet when you shampoo it. Velvet carpets are usually more expensive than tufted ones.

1.39 *Wilton* carpet is usually very strong, and has a dense pile, as shown in Fig. 1-8. For these reasons, it has been used for many years in commercial facilities. The name “Wilton” comes from an English town of the same name where the Wilton loom was invented. The Wilton loom is much more complex than the velvet loom. It weaves the pile yarns and backing yarns together at the same time and, as shown in Fig. 1-8, it can feed five or six different colored yarns at the same time. It also can produce sculptured or embossed designs by varying the pile height, mixing high and low loops, or combining cut and uncut loops. If your company symbol or trademark is woven into the carpet in your lobby, it probably was made on a Wilton or an Axminster loom.

1.40 Although the loom for weaving *Axminster* carpet was invented by an American, this weave also is named after an English town. Like the Wilton

loom, this loom weaves the pile yarn with the backing yarn at the same time. As shown in Fig. 1-9, the Axminster loom can handle a great many colors at one time, thereby producing multicolored carpet at low cost. It can also produce carpet with complex designs—geometric, floral, modern, stylized, etc. Axminster carpet almost always has cut pile tufts instead of loops. Sometimes the cut pile of Axminster carpet sheds in heavily trafficked areas.

1.41 The dense pile of high-quality Axminster carpet gives excellent crush resistance and long wear. Axminster has a heavy back reinforced by ribs. The ribs are so heavy that you can roll the carpet in one direction only.

1.42 **Knitted carpet.** *Knitted* carpet is similar to woven carpet, because the pile and backing yarns are interlocked in the same operation. The difference is that the yarns are knitted together with different sets of needles, instead of being woven together by a loom. Knitting is faster than standard weaving, but slower than high-speed tufting. Therefore, knitting produces very good carpet at a moderate cost.

1.43 The tufts of a knitted carpet are firmly locked in position by a special chainlock stitch. They also are arranged in a checkerboard design so that they give each other better support, which helps them spring back into vertical position after being crushed. The checkerboard design also makes the pile look the same viewed from any direction. All of

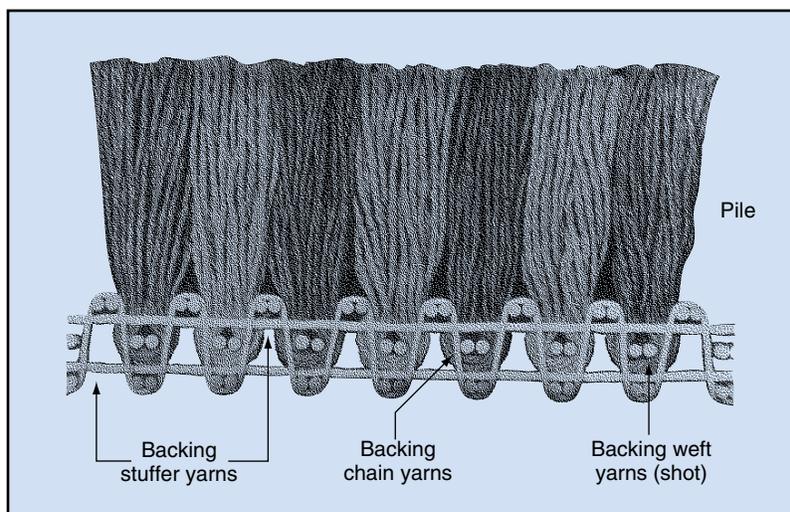
these qualities make a knitted carpet suited to areas where traffic lanes develop. For this reason some contract installers who lay carpet in office buildings and other large facilities prefer knitted carpeting.

1.44 **Flocked carpet.** Although the flocking process was used to make wallpaper in Europe 400 years ago, it has been used to make flocked carpet only recently. *Flocking* produces a soft vertical short *nap* on a back, instead of pile. Flock (nylon fibers) can be applied to a back by electricity, by a beater bar, or by spraying.

1.45 In the *electrical* process, short ($\frac{3}{16}$ in.) nylon fibers are charged with electricity and shot like small darts into an adhesive coating on the back sheet. Almost 18,000 fibers per square inch of carpet are bonded permanently to the back as the adhesive dries. After curing in an oven, layers of woven jute are applied to the back. Flocked carpets can be dyed after construction, or they can be made from fibers already dyed.

1.46 In the *beater bar* process, an adhesive-coated back sheet passes over a series of bars that vibrate it. As flock fibers are sifted onto the adhesive, the vibration makes them stand upright. In the *spraying* process, the flock is sprayed from a gun onto the adhesive-covered back sheet. Following either process, the carpet is cured in an oven. Flocking produces a level, cut pile (*nap*) surface. Because the flock fibers are short, straight, and close together, there is little room in a flocked carpet for dirt and germs to build up.

Fig. 1-9. Construction of Axminster woven carpet



Carpet Padding

1.47 Carpet *padding* is the material placed between the carpet backing and the floor. Padding also is known as *cushioning*, *lining*, *underlaying*, or just *pads*. The padding might or might not be attached to the carpet. Padding does not improve the quality of a carpet, but it makes a carpet feel softer and plush—and usually increases its wear life. It also often makes short pile carpet easier to clean and maintain.

1.48 Padding installed directly on a concrete floor protects the carpet from dust and moisture given off by the concrete. Dust and moisture can discolor the pile—and you will not know that you have a problem until it is too late.

1.49 Padding also helps to:

- lengthen carpet life
- reduce carpet crawl or creep
- increase sound-deadening qualities
- insulate against heat and cold
- absorb crushing forces on pile
- hide uneven floors.

Padding Materials

1.50 Carpet padding and/or cushioning usually is made from jute, animal hair felt, fiber felt, sponge or foam rubber, urethane foam, or synthetic fibers.

1.51 *Jute* comes from the jute plant, and often is used to make burlap bags. The fibers are twisted into yarn, and the yarn is woven into a cloth. (As you know, jute also is used in carpet backing.) In padding, jute generally is mixed with other natural or synthetic materials. It is not used often by itself. Jute absorbs water. Therefore, any carpet that covers a padding containing jute must be cleaned carefully. Jute-backed carpet that does not have a moisture barrier made from rubber, for example, will develop a dark brown stain if soaked through during shampooing. Jute also can mildew if it gets wet and stays wet.

1.52 *Animal hair felt* and *fiber felt* often are used to make a blanket-type pad. The pad can have a “waffle”

design to help make it more skidproof and provide a more cushioning effect, it can be reinforced with a jute backing, or it can be coated with rubber on both sides. The pad sometimes is coated on one or both sides with an adhesive to make it stick to both the floor and carpet.

1.53 Animal hair and fiber felt pads are firm and relatively inexpensive. But they are subject to mildew and insect attack. Shampoo carpets installed over them very carefully. If the fibers get wet, the padding can wrinkle or mildew.

1.54 *Sponge* and *foam rubber* carpet cushions are made from either natural or synthetic rubber. They either are glued to the carpet during manufacturing, or laid on the floor during installation.

1.55 The surface of the cushion might be *waffled* to make the cushion softer and thicker. Rubber cushions come in many different degrees of firmness. Synthetic rubber is not bothered by mildew or insects. Carpets that have rubber cushions are much easier to shampoo than those with jute or felt padding. Even if they do get too wet, they usually do not wrinkle.

1.56 *Urethane foam* cushions are very similar to sponge rubber. They come in many degrees of thickness and firmness. What you have learned about sponge and foam rubber cushions also applies to urethane foam cushions.

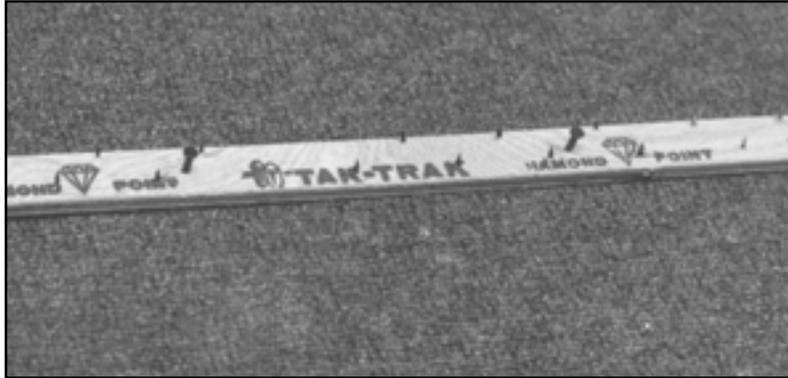
1.57 Carpet cushions made from synthetic fibers are usually firmer than foam or sponge cushions. Synthetic fiber cushions are made by bonding synthetic fibers together to form a blanket. They do not mildew.

Carpet Installation

1.58 How a carpet is installed greatly affects how you clean it. If it is not attached to the floor firmly, it can wrinkle when you vacuum or shampoo it. For example, “waves” might appear in the carpet in front of the vacuum as you push it. Or, if the carpet is attached with a water-soluble adhesive, it might dissolve upon contact with a wet shampoo. The most common installation methods are

- tacking
- tackless strips

Fig. 1-10. Tackless strip for installing carpet



- water-soluble adhesives
- nonwater-soluble adhesives.

1.59 *Tacking* is one of the oldest installation methods. In this method, tacks or staples hold the carpet in place. If the carpet is laid over concrete, a thin, narrow plywood strip is installed to hold the tacks. A disadvantage of tacking is that the tops of the tacks or staples are exposed to the air, and can rust or pull out. Be very careful when you vacuum or shampoo a tacked or stapled carpet.

1.60 *Tackless strips*, shown in Fig. 1-10, are the most common means of installing carpet. They are simply narrow strips of wood through which many evenly spaced tacks are driven. The strips are nailed or glued to the floor (usually only along the sides of the room) with the tacks sticking up. The edges of the carpet lie on top of the strips, which hold them in place. The strips provide a very good bond. Their only disadvantage is that, when they are used with thin carpets, the strips sometimes bulge. Certain carpets installed with tackless strips also stretch or wrinkle, and pull away from the tackless strips.

1.61 Carpets glued directly to the floor, stairs, or wall with *water-soluble adhesives* are very firmly bonded. (Normally, padding is not used when carpets are glued.) The wrong adhesive can cause problems,

however. Sometimes the adhesive dries out and the carpet wrinkles. When shampooing a glued carpet, be careful not to get it too wet, because the water can dissolve the adhesive. The dissolved adhesive can soak into the carpet pile and stain it, or the carpet can wrinkle.

1.62 Carpets glued with water-soluble adhesives can be replaced easily, however. After the carpet is pulled up, just scrub the adhesive off the floor with a good water-based stripping solution.

1.63 *Nonwater-soluble adhesives* eliminate most of the problems produced by water-soluble ones. But these adhesives are *permanent*, and when a carpet must be replaced because of wear, staining, etc., the adhesives cause a major problem. After the old carpet is taken up, the floor might have to be sanded before a new carpet can be laid.

The Effect of Carpet Color

1.64 The color of a carpet affects how often you must shampoo it, as well as how much time you need to spend vacuuming it daily. As a general rule, solid and/or dark colors require more daily cleaning time, and must be shampooed more often. They simply show soil more. Tweeds (mixtures of colors) and patterns do not show dirt as much. Medium colors help to hide soil.

16 Programmed Exercises

<p>1-9. The most widely used carpet in buildings today is _____ carpet.</p>	<p>1-9. TUFTED Ref: 1.33</p>
<p>1-10. Needlepunching produces a carpet that is _____ than most other carpets.</p>	<p>1-10. HARDER Ref: 1.35</p>
<p>1-11. What kind of carpet is well-suited to areas where traffic lanes develop?</p>	<p>1-11. KNITTED Ref: 1.43</p>
<p>1-12. The carpet that has a short nap instead of pile is made by _____.</p>	<p>1-12. FLOCKING Ref: 1.44</p>
<p>1-13. The material placed between carpet backing and the floor is called _____.</p>	<p>1-13. PADDING Ref: 1.47</p>
<p>1-14. Padding keeps _____ and _____ given off by concrete floors from entering carpet pile.</p>	<p>1-14. DUST; MOISTURE Ref: 1.48</p>
<p>1-15. Is it easier to shampoo carpet if the cushion is made from felt or rubber?</p>	<p>1-15. RUBBER Ref: 1.55</p>
<p>1-16. After removing carpet held by a non-water-soluble adhesive, you may have to _____ the floor before laying a new carpet.</p>	<p>1-16. SAND Ref: 1.63</p>

Answer the following questions by marking an “X” in the box next to the best answer.

- 1-1. Pile is held together to form carpet by a
- a. back
 - b. screen
 - c. tuft
 - d. warp
- 1-2. The top surface of the pile yarns is called the
- a. face
 - b. loop
 - c. tread
 - d. weft
- 1-3. Carpets that wear better than others usually have greater
- a. backing thickness
 - b. pile density
 - c. resilience
 - d. scrim size
- 1-4. The main disadvantage of wool carpet is that it _____ than synthetic carpets.
- a. absorbs more moisture
 - b. is more expensive
 - c. is more subject to mildew
 - d. stains more easily
- 1-5. The material most commonly used for making carpet fibers is
- a. cotton
 - b. jute
 - c. nylon
 - d. wool
- 1-6. Which of the following synthetic carpet fibers does *not* build up static electricity?
- a. Acrylic
 - b. Nylon
 - c. Polyester
 - d. Polypropylene
- 1-7. About 95% of today's carpets are made by the process called
- a. flocking
 - b. knitting
 - c. tufting
 - d. weaving
- 1-8. The woven carpet that is simplest in construction and usually comes in one color is the _____ carpet.
- a. Axminster
 - b. tweed
 - c. velvet
 - d. Wilton
- 1-9. A carpet that looks the same when viewed from any direction usually has tufts that are
- a. arranged like a checkerboard
 - b. cut
 - c. looped
 - d. stiff
- 1-10. Rubber cushions for carpets can be made softer and thicker by a process called
- a. corrugating
 - b. double backing
 - c. running
 - d. waffling

SUMMARY

Carpet—defined simply as textile fabrics used for covering floors and stairs—can be made from a great variety of materials. The *pile* or *nap* of the carpet can be made from either natural fibers or synthetic fibers. The fibers are spun or twisted into *yarn*, and this yarn is woven, tufted, knitted, or needlepunched into a *pile*. The pile is attached to a *backing* that holds it together to form the carpet.

The pile *face* is important to the custodian because it is the part of a carpet that receives the traffic wear and soil. A low-level *loop* pile face is designed for heavy traffic areas. A *cut* pile face is attractive but crushes easily. A *shag* face has a ragged appearance that helps to hide dirt and soil. The pile density of a carpet affects how well the carpet wears. Soil will not sink in as deeply in a dense pile carpet.

Wool carpet is strong, resilient, and resists abrasion well. However, wool is expensive, and it

stains more easily than synthetic fibers. It also absorbs water, and is therefore subject to mildew. **Nylon** is the fiber material most commonly used in carpet. It is noted for its strength. The main disadvantages of nylon carpets are pilling and static electricity buildup. Carpet manufacturers often *blend* or mix several different types of yarns in a pile to combine the best properties of each.

Carpet padding is the material placed between the carpet backing and the floor. Padding helps to lengthen the life of a carpet, increase its sound-deadening qualities, insulate against heat and cold, absorb crushing forces, and hide uneven floors.

Tacking is one of the oldest methods of installing carpet. Other techniques include the use of tackless strips, water-soluble adhesives, and nonwater-soluble adhesives. Each of these installation methods has its own advantages and disadvantages.

Answers to Self-Check Quiz

- | | | | | | |
|------|----|------------------------------|-------|----|---|
| 1-1. | a. | Back. Ref: 1.06 | 1-6. | d. | Polypropylene. Ref: 1.23 |
| 1-2. | a. | Face. Ref: 1.07 | 1-7. | c. | Tufting. Ref: 1.33 |
| 1-3. | b. | Pile density. Ref: 1.11 | 1-8. | c. | Velvet. Ref: 1.37 |
| 1-4. | b. | Is more expensive. Ref: 1.16 | 1-9. | a. | Arranged like a checkerboard. Ref: 1.43 |
| 1-5. | c. | Nylon. Ref: 1.17 | 1-10. | d. | Waffling. Ref: 1.55 |