

Skin and Skin Products (Leather)

Found in such items as clothing, shoes, saddles, drum heads, and quivers

Identification and General Information

Of all the items made from natural materials, those derived from animal skins are some of the most versatile and durable found in collections. Processing animal skins and skin products into clothing, cooking vessels, storage containers, and many other items is considered one of the first industries in human history. Membranes from bladders, stomachs, tendons, and other animal parts are also used to make clothing, bags, and threads and to decorate items.

Skins are found in items in all shapes, sizes, and colors and come from many different animals, including mammals, birds, and fish. Identifying the animal origin of a skin can be easy or difficult, depending on how it was processed and used. Frequently, the pelt has been minimally processed, and the fur or feathers have been left on, making the identification easier. More commonly, however, the hair has been removed by chemical and physical processing. The skin has been turned into a durable material by means that are explained below. Most skins are smooth, at least on one side, which is called the hair or grain side. The other, rough, felted surface is called the flesh side. Skins used as drumheads or for documents like treaties or book pages have been scraped very thin on both sides and stretched and dried, producing a smooth, almost shiny material. To identify these highly processed skins, you have to look closely at the grain pattern, which is formed by hair follicles (holes) where the hair grew.

The skin is the largest organ found in most animal bodies. It is made up of natural chemical building blocks called polymers. Polymers are very long chains that give the material certain properties, such as elasticity. Skin is made up of a protein polymer called collagen.

Creating a usable item from a raw skin requires processing by both chemical and physical means. To make a durable, waterproof material for clothing and footwear, some cultures used a mixture containing animal brains to chemically stabilize the skin. This process is known as *brain tanning* or *semi-tanning*. *Leather tanning* is done with vegetable or mineral tannages, or a combination of both.

In general, the conversion of skins and hides into semi-tanned items or leather includes the following essential steps:

1. Cleaning and purification of the fibrous (corium) layer of the skin
2. Chemical stabilization, for example, tanning
3. Lubrication, for example, with marrow or fat, and coloring, such as with clay to make white buckskin
4. Drying and stretching and surface treatments, for example, smoking, to produce a dark-colored, waterproof material

The deterioration of skin products is caused by:

- excess heat, which leads to shrinkage of the fibers, tears, and stiffness;
- excess moisture, which leads to swelling, distortion, stiffening, or putrefaction, and which also promotes mold growth and further deterioration;
- combination of high heat and moisture, which causes the collagen to break down;
- insect attack, especially on skins with fur and feathers, which causes loss, weakness, and disfigurement;
- acids or alkalies (bases), which break down the skin fibers;
- exposure to light, which causes fading and chemical deterioration.

The following descriptions clarify these materials.

Skin: (1) the outer covering of a vertebrate animal; the main constituent consists of collagen, which is a type of protein; (2) the finished product from a smaller animal.

Hide: the skin of larger animals, such as elk, moose, or bison.

Sinew: the connective tissue of larger mammals, such as deer; it is generally used for sewing threads.

Gut: the tissue found in stomachs and intestines; it is usually processed into a type of rawhide and used for clothing, fishing floats, and other items.

Rawhide: skin that has been scraped and stretch dried; it is generally used for fasteners, food containers, shields, and body armor.

Basic Care and Storage

Consistent temperature and humidity conditions are important. Follow the recommendations in *Basic Care*. Stable, cool, and dry conditions usually are best. Avoid storing items near sources of heat that could cause excessive drying and shrinkage. Shrinking skins places stress on the structural framework of some items, such as wooden drums, boats, and snowshoes, causing strain that can lead to warping or cracking, and the skins may tear.

Three-dimensional skin or leather items that still have some flexibility may be stuffed with unbuffered, acid-free tissue paper in order to retain their shape. Some items may need external supports for proper storage and display so that the pressure of the item's weight does not distort its shape.

Skin garments and hides can be stored on flat mounts. A flat mount acts like a supportive inflexible tray for an item in storage or used for display. Flat mounts serve two purposes: to

support an item when it is in storage, and to provide a support to facilitate moving it without undue flexing and handling. Garments can be stored on this type of mount if when lying flat, they are not distorted. Some may need to be stuffed with unbuffered acid-free tissue. Flat mounts are commonly stored within a box or drawer or on a shelf covered with muslin fabric.

Use acid-free corrugated board for flat mounts. If an item is heavy, it may be necessary to use a thicker board that will not flex. Another material for support is called Coroplast, a polypropylene and polyethylene corrugated board. Coroplast is used by sign makers and may be available locally. However, if acid-free board or Coroplast is not available, then corrugated cardboard with a barrier of Marvelseal or polyester film is another option.

Items with straps, handles, or other attachments must never be hung or supported by those attachments. A support can be provided at the base of the item, and the handle or strap can be supported in a natural position.

Special Pest Concerns

Skin items are highly susceptible to mold growth, so high levels of relative humidity in combination with still air are a problem. If, however, you keep the relative humidity below 60 percent and maintain good air circulation, you probably will not have a problem with mold.

Insects are another concern. Several species attack skin items and can destroy them. Dermestids, especially hide and larder beetles and carpet beetles, are common threats. Maintaining acceptable levels of relative humidity and implementing a program of integrated pest management will discourage insects.

Rodents and other small mammals may attack skin items as a food source. As with insect control, good housekeeping and maintenance of the building in which items are kept are important. Glue boards are a useful rodent monitoring and trapping device if used properly and

checked regularly. Live traps are also a useful and humane control method. Consult your licensed pest control operator as to which method best suits your situation.

Routine Handling

The general methods and techniques for handling all items apply to skin and leather items. Skin items can be handled with bare hands as long as they are clean and dry. Be sure to wash your hands before handling skin items so that you do not leave dirty or oily fingerprints behind. Body oils can stain skin items, especially those that are light colored and have a sueded surface texture. Use your judgment on whether to wear gloves. If the gloves do not fit snugly, they may catch on the edge of some skin items and tear them. Also, if you choose to wear gloves, be sure to change them as soon as they become soiled.

When lifting and moving a skin item, make certain that it is supported well and that no stress is put on weak seams or attachment points. Use a tray or other support if necessary. Large, complex, and heavy skin and leather items, such as saddles and shields, should always be moved and handled using their storage supports.

Display Issues

The temperature and relative humidity ranges mentioned in the *Basic Care* also apply to display conditions. In particular, skin and leather items used for display should be supported fully to prevent stress to attachments and seams and inspected regularly for rodent, insect, and mold infestation and damage.

Plan to rotate skin and leather objects during displays of long duration. Items that are dyed or have light-sensitive components should not be left on permanent display as irreparable fading and physical damage of the skin will occur. The length of time that an item should be

used for display depends on the particular item and the amount of light to which it will be exposed.

Mounts and Supports

Internal supports for leather and skin items that have some flexibility can be made of unbuffered, acid-free tissue paper. Internal supports for footwear and containers, for example, can be easily constructed from polyester thermal-bonded batting or crumpled, unbuffered, acid-free tissue paper. Paper or batting are inexpensive, easily obtained, and easily shaped to conform to the object.

External supports can be fabricated from acrylic plastic sheeting, such as Plexiglas, and shaped with heat to conform to an item's surface shape. Avoid the use of unpadded metal wires, and do not attach skin objects through existing holes with fasteners such as metal screws. These methods can cause staining and tearing at the attachment points. Adhesive mounts also should be avoided. These can cause irreversible damage to the skin and leather such as staining, loss of surface texture, and stiffening, and if the adhesive bond fails, the item can fall from its mount. Stitching skin and leather items, such as buffalo robes, to backings for vertical display is discouraged. These items can be very heavy, and stitching thread can cause tearing of the skin around the holes from the item's weight over time. An alternative is to support large, flat skins and hides on tilted boards (slant boards) that are covered with a coarse textile to help grip the item. It is better to attach items to mounts with padded wires or flat acrylic plastic clips rather than to pierce the skin with a needle and thread. Stapling a skin item to a backing will also cause permanent damage from the pressure of the staples and the size of the holes, and possibly staining from rust. Avoid using copper or brass attachments or supports in direct contact with skin or leather. The oils in the skin and leather can react with the metals and permanently stain

the items.

Cleaning and Minor Repairs

Periodic inspection and maintenance are the best way to assure the long-term preservation of skin and leather items. Surface dust can be removed with a variable speed vacuum, brushes, and micro-attachments (see *Cleaning Practices*). Carefully inspect the item before cleaning for loose parts, weak seams, and fragile decorations such as flaking paint layers.

Undecorated skin surfaces that have greasy dirt can be cleaned with vulcanized rubber sponges after the surface has been vacuumed to remove extraneous dust. Gently move the sponge across the surface in one direction. Cut away the dirty part of the sponge when it becomes soiled. Avoid using liquid cleaners or detergents on skin and leather items. Saddle soap should also be avoided as it can never be completely removed from skin and leather and can cause stiffening and discoloration over time. If a greater level of cleaning is required, contact a conservator for further advice.

Skin and leather items do not need to be lubricated or fed on a regular basis with moisturizers, oils, waxes, or lubricants. Excess use of these, especially on gut and rawhide, will soften and stain the items permanently. This will change the appearance and nature of the items, lessening their historical and cultural value. Semi-tanned skins should never be treated with any oils or waxes, as these will change the surface coloration and texture. Sometimes a wax coating is applied to certain leathers after surface cleaning. A museum-quality microcrystalline wax can be used for this.

Skin and leather items are often stiff and distorted. Humidification in a controlled manner can be used to reshape an item and restore its original appearance. Steaming or spraying water directly on skin and leather to humidify it for reshaping can be dangerous. These treatments may

cause staining and in the case of colored items may cause the color to dissolve and to bleed. Consult a conservator for more details about treatment if you have stiff or distorted items.

Sewing should not be used to reattach loose parts unless the original stitching holes are present and are strong enough to withstand the stress. Using adhesives and backing fabrics to repair tears and holes is also discouraged, as these repair methods are difficult to do and may result in stiffening and staining of the skin. Tears and holes can be evidence of use and may provide information about an item's history. If an item is not required for use, standard museum practice would leave it unrepaired.