

# Leather Golf Gloves With Improved Washability and Perspiration Resistance

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## Introduction

It has been reported for sometime in the literature (1-7, 10) that glutaraldehyde, as a tanning agent, will impart to leather increased resistance to perspiration and will help leather withstand the effects of washing in hot, soapy water (1, 3, 5). Most of the laboratory tests were run with "synthetic perspiration" solutions, somewhat similar to the one reported by Colin-Russ (8). It should be noted that such formulations have not been accepted unanimously by workers in the field. The problem of a good, standard test for perspiration resistance remains a matter of active interest in leather research circles. There have been no laboratory tests on these leathers using natural perspiration due mainly to difficult problems of availability and variability of perspiration (6, 9). However, for the past five years or more many tanners and shoe manufacturers have practical evidence that glutaraldehyde-chrome leathers are more resistant to real perspiration while in use. Their leathers have special acceptance in the trade as "perspiration resistant."

Ordinary chrome-tanned leathers become stiff and drop in shrink temperature quickly when they are washed (11) in hot, soapy water (pH about 10). In other laboratory tests, glutaraldehyde-retanned leather remained soft after repeated washings, prolonging the useful life of the leather (10). Golf gloves form an ideal, practical item for testing leather to evaluate the properties of washability and perspiration resistance. Golf is a leisurely pursuit but hard on gloves, and those enjoying the game usually have enough time and interest to keep simple records during the test period. We therefore chose this way to evaluate the ser-

viceability of glutaraldehyde tannage.

## Glutaraldehyde Retannage of Chrome-Tanned Cabretta

The leather for the gloves described above was made from wet, chrome-tanned cabretta, obtained from a tannery immediately after the chrome-tanning step. The skins, as received, were analyzed on a moisture-free basis, as follows:

Chrome (as  $\text{Cr}_2\text{O}_3$ )=2.61%  
Ash=3.42%

These skins were retanned with glutaraldehyde by drumming for about six hours in a solution comprising:

Water, 100% (based on wet blue weight)

Glutaraldehyde (25% aqueous solution), 10% (based on wet blue weight)

pH=4.2 (no salts or buffers added)

Temperature=55°C. (approx. 130°F.)

They were washed for 1/2 hour and then horsed overnight covered with a polyethylene sheet,  $T_s=96^\circ\text{C}$ . The wet skins were shipped to a tannery for fat-liquoring and finishing into glove leather. The final shrink temperature of the leather, as used in the gloves, was  $92^\circ\text{C}$ , and the chloroform-extractable material was 14.89%.

## Discussion of Results

Gloves were given to 22 golfers who averaged about thirty 18-hole rounds of golf during the April to November season. They were asked to wear the gloves in their normal way and wash them when necessary. The gloves were off-white (neutral) in color. They were instructed to wash the glove, while on the hand, with

warm water (comfortable temperature) and soap or detergent. Several, on their own initiative, used an abrasive cleanser containing chlorine to remove resistant stains. The latter gloves came through fairly well considering the unscheduled punishment. Each person was asked to keep a record of the number of times the glove was used, washed, etc. Also, each was asked to report their opinion on how the glove withstood wear, perspiration, washing; how it retained size, appearance, and softness; and how it compared with gloves they have purchased previously.

The test gloves made from glutaraldehyde-retanned, chrome-tanned leather were completely favored over standard gloves previously purchased; all those reporting rated the gloves excellent. The gloves wore well and withstood repeated washing (five to eight times during the season) without shrinking. (Later tests on the used gloves indicated that the shrink temperature of the leather dropped over a period of 1-1/2 years but not enough to cause glove shrinkage when washing was done with water at a moderate temperature.) The golfers reported that a little manipulation of the washed glove, after it dried, restored most of the original softness. Moreover, since the gloves were not washed every time they were worn, it was important to learn that repeated drying of gloves wet with perspiration did not stiffen the glove and cause the leather to crack, as in standard gloves.

This report is not intended to imply that the leather was as good as new when the gloves finally wore out. Near the end of their usefulness, some of the gloves became somewhat stiffened and stained (stains not removable by washing). The condition of the various gloves at this stage varied

with the use and treatment by the wearer. The main point of interest is that each golfer indicated that the test glove lasted much longer and felt more comfortable over a longer period than any golf glove he ever had.

Although the tannage described was tested on golf gloves, the improvements and desirable properties imparted to the leather may also apply to leather intended for work or dress gloves.

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