TECHNICAL NOTE 3764

GLUTARALDEHYDE RETANNAGE OF CHROME TANNED LEATHER AS A PRETREATMENT TO APPLICATION OF A COMMERCIALLY AVAILABLE FLUOROCHEMICAL

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A commercially available fluorochemical, when properly applied to leather, is reported to impart repellancy to both oil and water and resistance to acids, alkalies, mildew, and perspiration, and to cause the leather to take on a permanent lubrication. It is essential for good results that the leather treated with this material be chrome tanned and converted to an anionic condition because of the cationic nature of the fluorochemical. Technical information on this treatment now indicates that glutaraldehyde retanned chrome leather is a suitable substrate for application of Scotchgard FC-146*; however, no details are given (1).

Even without this indication, glutaraldehyde retanned chrome leather would appear to be a suitable substrate for the following reasons. The glutaraldehyde retanned leather dries to a softer and more flexible condition than chrome tanned leather and this property should be augmented by the lubrication properties of the fluorochemical. This retannage has been shown to be a factor in promoting the efficiency of water-repellant treatments on chrome leather (2, 3). The glutaraldehyde retannage also imparts perspiration resistance and washability properties to chrome tanned leather (4).

This note briefly reports the results of application of Scotchgard FC-146 to glutaraldehyde retanned chrome leather.

MATERIALS

The leather used was a commercially chrome tanned cabretta which had been retanned with ten percent glutaraldehyde and dyed with a Procion dye. The fluorochemical used was Scotchgard FC-146 obtained from Minnesota Mining and Manufacturing Company. It contains 30 percent "active" ingredient in isopropanol. References made to fluorochemical solution strengths used are based on the "as is" basis.

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*Reference to brand or firm name does not constitute endorsement by the U.S. Department of Agriculture over others of a similar nature not mentioned.

TREATMENTS AND METHODS

Experiments showed that a dipping process could be used as an application technique. The procedure followed was first to run the wet stock through a mechanical hand wringer twice, with the pressure screw turned hand tight. Treatment solutions used were: 1, 2.5, and 5.0 percent by weight Scotchgard FC-146. Each sample was weighed and then immersed in excess solution and gently shaken for five minutes. The samples were reweighed after excess liquid was removed by pulling the sample across the lip of a beaker. The increase in weight was used to estimate the amount of treatment solution taken up by the leather sample. After treatment, the samples were allowed to air dry at ambient temperatures.

The washing procedure used is described in ASTM Method D2096-69 (Procedure B) (5). Static water absorption tests were done according to the specifications of ASTM Method D1815-60 (6).

RESULTS AND DISCUSSION

All the samples treated with the Scotchgard FC-146 air dried soft and flexible. The static water repellancy was estimated by placing a drop of water on the grain surfaces of the treated samples. The distinctly rounded beads which formed on all samples demonstrated good static surface water repellancy. After the samples had been washed, a water drop on the grain surface gave a flattened appearance. This indicated a reduced degree of surface water repellancy. However, in no case did the leather surface wick up the water or darken in the area of the water drop.

When a stream of water from a wash bottle was directed at the grain surface of the washed leather samples held in a vertical position, the water flowed readily off all samples and no noticeable wetting of the surface occurred, using surface darkening as the criterion of wetting.

These observations indicate that a good degree of static water repellancy was obtained, which was maintained through the washing procedures used.

The water absorption values after washing are listed in Table I. The data show that, within the limits of the concentrations we tested, the water absorption decreases with increasing concentration of the treatment. The higher concentration of treatment also considerably reduces the water absorption between the first and third wash test sample.

The samples at all levels of treatment went through three washes and air dried without any noticeable change in condition. Shrink temperatures run before washing were all 92°C. After three washings, the shrink temperatures ranged from 87° to 90°C. for the three levels of treatment.

These results confirm that a glutaraldehyde retannage does act to convert chrome tanned leather into a condition suitable for treatment with the fluoro-

TABLE I

STATIC WATER ABSORPTION

FC-146 Treatment (% Solution)	Wt. Gain Due to FC-146 Uptake* (%)	Water Absorption after 24 Hours Immersion† (%)		
		1st Wash	2nd Wash	3rd Wash
1.0	0.9	130.2	160.9	170.8
2.5	2.2	96.8	120.3	119.9
5.0	3.2	80.0	89.0	83.7

*Based on dry weight of the leather.
†Percent weight gain over original weight.

chemical Scotchgard FC-146. The treated leather samples air dry soft and flexible without additional fatliquoring. Results show that a range of static water absorption values can be obtained by varying the concentration of the Scotchgard FC-146 treatment and still retain static water repellancy and permanent lubrication effects. Repeated washings did not alter the ability of the treated leathers to dry back to their initial condition and maintain static water repellancy.

The properties of this leather indicate that it could have value in areas where normal usage would involve frequent contact with water. One advantage of the glutaraldehyde retannage is that a separate step to get to the anionic condition is made unnecessary. In addition, the need for fatliquor may be further reduced because of the increased flexibility due to both treatments.

REFERENCES

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