

Stain Removal From Tablecloths

With Soil Release Finishes

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Introduction

Homemakers welcomed with enthusiasm the durable press or "no iron" finish that nearly revolutionized the clothing industry several years ago. It was soon apparent, however, that some laundry problems accompanied this time and labor saving innovation. The synthetic fibers used in cotton blends and the "no iron" finish applied to cotton retained oily stains even after stain removal methods were used.

Manufacturers, eager to eliminate this undesirable characteristic of durable press fabrics, introduced the first stain and soil release finishes in 1966. Tablecloths and men's shirts were the first articles treated with the new finish.

A soil release finish does not prevent initial soiling, but it does enable deposited dirt to be removed in laundering. A soil repellent finish, on the other hand, keeps soil on the surface of the fabric so that it can be wiped off. Soil repellent finishes, consisting of a protective film on the surface of the

fabric, appeared first on the market. Because some dirt eventually penetrated the protective film and became trapped in the fabric, a soil release system was developed which allowed deposited dirt to be washed away. The most effective finishes combine both soil repellency and soil release characteristics.

Soil Release Finishes Selected

In 1968, a study was undertaken in the textile research laboratory to determine the effectiveness of various stain removal methods on tablecloths with three different soil release finishes.¹

Retail stores were visited to determine which finishes were most often applied to table linen. Tablecloths which had been treated with three of the most common soil release finishes were selected. In order to find tablecloths with these soil release finishes, it was necessary to use cloths that were not identical in fiber content and weave construction.

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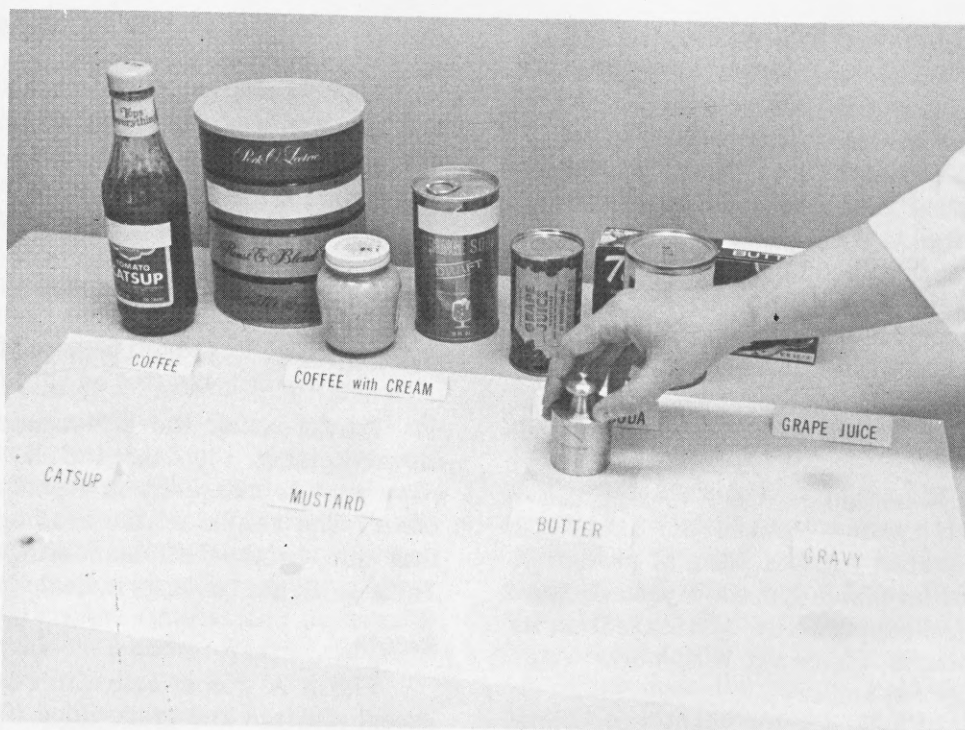


Fig. 1. When stains were applied, a 500-gram weight was used to force the stain into fabric in instances when surface tension created a bead.

The first tablecloth was a combination plain and leno weave of 100 per cent cotton. It had been treated with a dual-action finish that formed a protective coating on the surface of the fabric and also provided release of ground-in oily stains. It is referred to as Finish A.

The second cloth was 100 per cent high-wet modulus rayon with a plain weave construction. This tablecloth was chemically treated with a protective coating to prevent deep penetration of stains into the fibers and is referred to as Finish B.

The third cloth was a blend of 80 per cent rayon and 20 per cent cotton constructed by the Mali or "stitch-through" method. The soil release finish applied to this cloth was developed to overcome the tendency of durable press fabrics to retain oily stains and is referred to as Finish C.

Staining and Laundering Procedures

The tablecloths were divided into swatches suitable for testing. Nine swatches measuring 13x26 inches were cut from each tablecloth. Each swatch was subdivided into eight test areas, and each test area was spotted with one of eight common household stains. The stains selected were gravy, mustard, butter, coffee, coffee with cream, orange soda, catsup and grape juice. Each swatch was placed on a glass surface covered with absorbent paper. One drop of each stain was applied from a height of three inches. A template was used to center the

stain on each test area. Where surface tension created a bead, a 500-gram weight was placed on the spot for 15 seconds (Fig 1). Thirty seconds after application, the test spots were blotted and allowed to dry for two hours.

Each swatch was laundered five times before being restained. The staining process was repeated after the fifth, tenth, fifteenth and twentieth launderings. The swatches were laundered a total of 25 times.

Each tablecloth was treated by four different stain removal methods.

Method 1 — regular machine washing — Swatches were laundered without any special handling in a regular laundry cycle. Labels on the tablecloths suggested that household stains could be removed in regular home launderings.

Method 2 — stain removal concentrate — Dried stain was treated with a stain removal concentrate that was allowed to stand 30 minutes before the swatches were laundered.

Method 3 — enzyme active pre-soaking product — Stained swatches were soaked overnight in an enzyme active pre-soaking product. A regular laundry cycle followed the overnight soaking.

Method 4 — traditional stain removal methods — Each stain was treated with the traditional stain

removal method followed by a regular laundry cycle. The following stain removal methods were used:

- Gravy—Soak in warm, soapy water.
- Mustard—Moisten the stain. Rub glycerin into the stain. Soak in warm, soapy water. Rinse well.
- Butter—Saturate the stain with V.M.&P. naphtha (available at a hardware or artist supply shop). Loosen the stain with a brush. Flush out with V.M.&P. naphtha. Feather out and dry.
- Coffee—Pour boiling water from a height of three or four feet. Wash with warm, soapy water. Rinse well.
- Coffee with cream—Moisten the stain with warm water. Apply a paste of protein digestant (available from a drycleaner or a chemical supply house) and leave it on for 30 minutes. Flush out with warm water. Feather out and dry.
- Soft drink—Flush out the stain with water. Apply warm glycerin (120°F) and work it

into the stain with a brush or spatula. Flush out with water.

Catsup—Moisten the stain with warm water. Apply warm glycerin (120°F). Work the stain with a brush. Flush out with water. Apply a paste of protein digestant and leave it on for 30 minutes. Moisten frequently with warm water. Flush out with water. Feather out and dry.

Fruit stains—Stretch the stained area over a bowl. Pour boiling water from a height of two or three feet on white cotton or linen.

To determine the effectiveness of stain removal methods, the degree of discoloration of the swatches was measured on a photovolt reflectance meter. The results of the readings following the first and twenty-fifth launderings are shown in Table 1. Higher readings indicate less discoloration.

Results

Finish A was effective in releasing all stains except mustard and grape juice. The stain removal concentrate was the most successful method in re-

Table 1. Comparison of whiteness retention as obtained by reflectance readings¹ for various laundry treatments when tablecloths had a soil release finish.²

Laundry Treatment	Times Laundered	Soil Release Finish	Unwashed	Washed	Gravy	Mustard	Butter	Coffee	Coffee with Cream	Catsup	Orange Soda	Grape Juice	Controls		Stains ₃	
Regular Laundry	1	A	82	81	81	78	82	81	82	81	81	81	79			
		B	80	82	81	80	81	81	81	81	81	81	81	81		
		C	80	83	82	79	82	81	82	81	81	82	82	79		
	25	A	82	82	82	75	82	80	81	79	82	82	73			
		B	80	82	82	80	81	81	82	82	82	82	81			
		C	80	83	83	79	82	80	82	82	82	82	72			
Stain Removal Concentrate	1	A	82	81	82	81	83	82	82	82	82	82	81			
		B	80	82	82	82	82	82	82	82	82	82	82	82		
		C	80	83	83	82	83	82	82	83	82	83	79			
	25	A	82	82	83	81	82	82	82	82	82	83	79			
		B	80	82	82	82	82	82	82	82	82	82	82	82		
		C	80	83	83	82	83	82	82	82	83	83	74			
Enzyme pre-soak	1	A	82	81	83	79	83	82	82	79	83	72				
		B	80	82	82	80	81	82	81	81	81	80				
		C	80	83	83	80	83	82	82	81	83	79				
	25	A	82	82	83	75	82	81	81	81	83	68				
		B	80	82	82	79	82	82	82	82	82	81				
		C	80	83	82	76	83	82	82	82	83	68				
Conventional Stain Removal method	1	A	82	81	83	81	82	82	82	80	82	79				
		B	80	82	82	81	82	81	82	82	82	80				
		C	80	83	83	82	83	81	82	83	82	79				
	25	A	82	82	83	80	82	80	81	81	83	74				
		B	80	82	82	81	82	82	82	82	82	81				
		C	80	83	83	82	83	81	82	83	83	81				

¹A higher reflectance reading indicates less discoloration.

²Tablecloths representing three soil release finishes were used in the study.

³Stains were applied to tablecloths before 1st, 5th, 10th, 15th and 20th laundering.

moving mustard and grape juice from this finish. This tablecloth remained white throughout the 25 launderings.

Finish B resisted all stains and required no special stain removal methods. A regular laundry cycle completely removed every trace of stain; however, the tablecloth developed a slight yellowness after the first laundering.

Finish C resisted all stains except the mustard and grape juice. The stain removal concentrate and conventional stain removal methods were the most successful treatments in removing these stains.

At the time this study was conducted, soil release finishes were relatively new. It was not possible to purchase tablecloths identical in fiber content and weave, but differing in soil release finishes. It is recognized that these differences in fiber content and weave may have influenced the effectiveness of the soil release finishes and the results obtained when various laundry treatments were used.

Suggested Laundry Procedures

It is not exactly known how fabric soiling occurs or just what factors determine successful soil removal. Studies show, however, a number of apparent reasons for problem soiling. Some finishes that manufacturers apply to soften fabrics treated for durable press attract soil. Fabrics with a rough textured surface are more likely to retain stains than smooth fabrics. Synthetic fibers, such as polyester and nylon, not only attract body and household oils during use, but also scavenge soil from laundry water. These problems are multiplied when homemakers use less than the recommended amounts of laundry detergent. As a result, the dirt fails to remain in suspension, is not rinsed away and stays imbedded in the fabric.

A good soil release finish can give top performance if these laundry procedures are followed:

- Read and follow instructions on merchandise labels with special attention to proper washing and rinsing temperatures.
- Blot or sponge spots or stains promptly. The longer stains are left in, the more difficult they are to remove. Aged stains should be pretreated with a concentrated solution of detergent for about an hour before laundering.
- Don't expose spots and stains to heat or sunlight, since some types can be "baked" into the fabric.
- Sort and wash white pieces separately from colored ones and heavily soiled pieces separately from those that are only lightly soiled.
- Keep washer loads small so suds and rinses can easily circulate. A mixed load of large and

small garments is better than all large garments.

- Use as much soap or detergent in the wash cycle as recommended on the container. Satisfactory results may be obtained with less detergent if the water is very soft.
- If a dryer is used, set it at the recommended temperature and remove soil release items as soon as they are dry to avoid wrinkling.

The Future of Soil Release

Today's homemaker, although undoubtedly pleased with the finishes that improve launderability of many tablecloths, children's clothes and men's work clothes, is faced with some minor difficulties. Sometimes fabrics treated with a soil release finish become yellow after laundering. Some soil release finishes give a harsh feel to the fabric, affect the durable press characteristics and are not effective for the life of the garment.

What does the future hold for soil release finishes? Some manufacturers predict an inexpensive, one-process system that will successfully apply soil release, durable press, anti-static and flame resistant finishes to fabrics without affecting any of the desirable characteristics. Another idea is a soil release chemical added to the final rinse water during home laundering. A further answer to soiling problems is the proposed elimination of durable press finishes that strongly attract oily soil. Soon to appear on the market are blends of changed synthetics that have their own built-in durable press characteristics.

Soil release finishes have come a long way since their introduction in 1966. Although this study of soil release finishes indicates that problem soiling has not yet been eliminated entirely, technical improvements over the past several years continue to bring still closer the homemaker's dream of effortless laundering methods with superior spot-free results.

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