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Technical Information

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February 2000

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# Pretreatment of cotton via Cold Pad Batch



## **COLD PAD BATCH PEROXIDE BLEACH**

The cold bleach technique has been around for a very long time. Although it is usually associated with short production runs and average quality, both can be overcome with the proper equipment and correct chemical formulas. The quality of fabric that has been cold bleached does not have to be different from any other bleach process. A good bleach should have the following properties:

- (1) Good removal of natural and added impurities as exhibited by low water and hydrocarbon extractables.
- (2) Complete removal of moles.
- (3) True absorbency resulting in uniform dye and chemical uptake.
- (4) Good physical properties, such as high tensile and tear strengths and low fluidity values.
- (5) An adequate degree of whiteness that allows the desired shade to be dyed or printed.
- (6) Uniform alkalinity

Also, the factors influencing a cold bleach procedure are no different from any other bleach process:

- (1) Greige goods
- (2) Liquor pickup
- (3) Saturation time
- (4) Type and efficiency of surfactant
- (5) Peroxide/alkali balance
- (6) Alkalinity and pH
- (7) Reaction temperature
- (8) Reaction time
- (9) Washer temperature and flow
- (10) Type of equipment

In order to come up with a good cold bleach formula, each of the factors listed above and how they differ from hot bleach procedures must be considered. In hot bleach procedures (temperature above 180°F), the chemical concentration increases when the reaction times are lengthened. This is because we are relying on heat as one of the main activators of the bleach. In cold bleach procedure where the reaction temperature is usually below 120°F, the reaction takes place much slower, and the activity of the bleach is more dependent on the chemical concentrations. This is why we have higher alkali and peroxide levels. Due to its slow reaction, a cold bleach procedure is one of the safest procedures that can be used in regard to fiber degradation.

### THE MOST COMMON MISTAKES IN COLD BLEACHING

- (1) POOR LIQUOR PICKUP yields an insufficient amount of chemicals on the fabric and also an insufficient amount of liquor to saturate and swell the fiber and the size and allow the reaction to take place evenly. In many cases, dye pads are used to pad on the cold bleach solutions. These are almost one dip-one nip pads, which while they allow sufficient saturation time for an absorbent piece of fabric, they do not allow enough time for a piece of greige goods that is virtually water repellent. The addition of rapid wetting agents, de-aerators, pick-up enhancers, slow running speeds, and low nip pressures are things that can be done to ensure a good pickup. While 100% cotton fabrics should pickup at least 100%, polyester/cotton blends will pickup less as the percentage of polyester increases. For example, 80/20 polyester/ cotton blends might only pickup 70%. It should be noted that increasing the chemical concentrations to compensate for a low pickup will not always result in a good bleach performance. There is still a need for a sufficient amount of liquor to be present on the fiber.
  
- (2) POOR WASHING can take the best bleach formulas and give a fabric that looks white and clean, but dyes and prints very poorly. All of the impurities that are loosened up by the chemicals, have to be washed free or else they can redeposit on the fabric interfering with subsequent processes. If the washing equipment is suspect, higher water temperatures and flows along with a means to neutralize and residual alkali, are the main things to try. Even if the goods must be run down a wash range twice to ensure a clean fabric, this is less expensive than trying to repair poor dyeings that are the result of poor washing.

- (3) Hydrophilic uniformity: Due to the exothermic reaction of the chemicals a temperature difference can develop from the inside to outside area of the roll of fabric on the A-frame.

Consequently, variations in the degree of whiteness and absorbency can occur. These negative effects can cause difficulties in dyeing, printing, and finishing.

To minimize these irregularities impact of these two critical steps, the following recommendations are suggested:

(1) Impregnation Box

A high liquor pick-up is required but the capacity of the box should not be high so that there is a risk of size build up. **MULTIPLUS<sup>0</sup> NB-100** facilitates delivery of more liquor to the fabric.

- (2) Provide an air passage( dwell time ) before batching to allow for liquor penetration into the fabric.

(3) Intensive Scouring

The purpose of intensive scouring is to achieve a better removal of the impurities that have become accessible during the bleaching process. This operation is assisted by the addition of a detergent (i.e., **KIERALON<sup>®</sup> N-DB, KIERALON<sup>®</sup> N-CD** or **KIERALON<sup>®</sup> MFB**) and a special product containing dispersing and complexing action (i.e., **PRESTOGEN<sup>0</sup> N-D** ). Extraction and dispersing agents (i.e. **DEKOL<sup>0</sup> N-SN** ) are of great benefit during washing. By working with the chemicals carried forth from the cold bleach in conjunction with the rapid cloth temperature elevation via passage through a steamer, maximum removal of cloth impurities extraction can be realized in subsequent wash steps. The addition of small amounts of caustic can also be found to boost whiteness and absorbency. Washing must always be given serious attention.

## Starch Removal

Sufficient starch removal from cotton and polyester/cotton goods is one of the more difficult problems for a cold pad bleach. The lack of reaction temperature and proper washing hinder starch removal. Sodium silicate, while aiding whiteness and mote removal, also hinders starch removal. The most efficient formulas for removing starch are those with no sodium silicate, but extra amounts of caustic soda and a small amount of sodium persulfate. When developing a cold bleach formula, a compromise between the degree of whiteness and starch removal has to be reached.

## Rotation and Wrapping

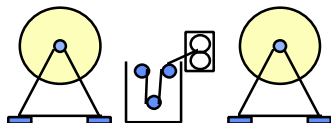
The best way to ensure uniformity in a cold bleach is to roll the fabric up on an A-frame, cover it completely in plastic, and slowly rotate it for the entire dwell time. Rotating prevents the excess liquor from settling in one spot. Covering the roll in plastic keeps moisture in and air out. Excess air tends to dry the fabric, which through evaporation can cause the chemicals to become more concentrated which results in fiber damage and uneven results. Wrapping also helps insulate the roll to maintain a more constant temperature throughout the roll.

## EQUIPMENT RECOMMENDATIONS

- (1) Impregnation pad (preferably 2 dip box)
- (2) Batching or dwell station (rolls or bins)
- (3) Washing -
  - a) Re-impregnation pad
  - b) Steamer (if available)
  - c) 6 wash boxes
    - include water sprays between boxes
    - include individual steam to each box

**Cold Pad-Batch Bleach Plus Intensive Scour**

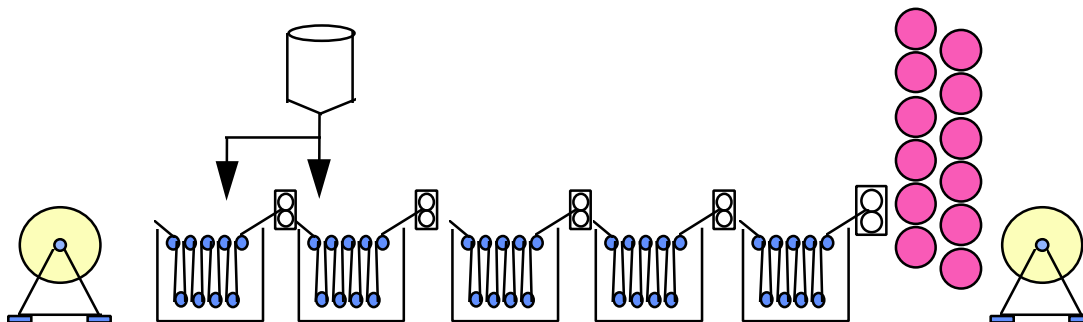
Cold pad-batch bleach/ Machine : impregnation unit



- 50 ml/l Hydrogen Peroxide 50%
- 50 g/l Caustic Soda 50%
- (10 ml/l Sodium Silicate)
- 5 g/l **Prestogen<sup>0</sup> N-D**
- 8 g/l **Kieralon<sup>0</sup> N-DB or Kieralon<sup>0</sup> MFB**
- 3 g/l Persulfate
- 1 g/l **Multiplus<sup>0</sup> NB-100**

Pad bath temperature: room temperature  
 Wet Pick-up: 75-100%\*  
 Batch temperature: room temperature  
 Batch time: 10-24 hours\*  
 \*(depending on fabric construction and fiber blend)

Intensive scour/ Machine : open width washer



To achieve the best scouring effects, it is recommended to meter in auxiliaries in the 1st and 2nd wash boxes. The mix is formulated proportional to the wash water feed to maintain the following in the wash box.

- 1-2 g/l **Kieralon<sup>0</sup> N-DB** or Kieralon<sup>®</sup> MFB
- 1-2 g/l **Dekol<sup>0</sup> N-SN**
- Washing temperature: at least 190°F

**Cold Pad-Batch Bleach Plus Boil Off**

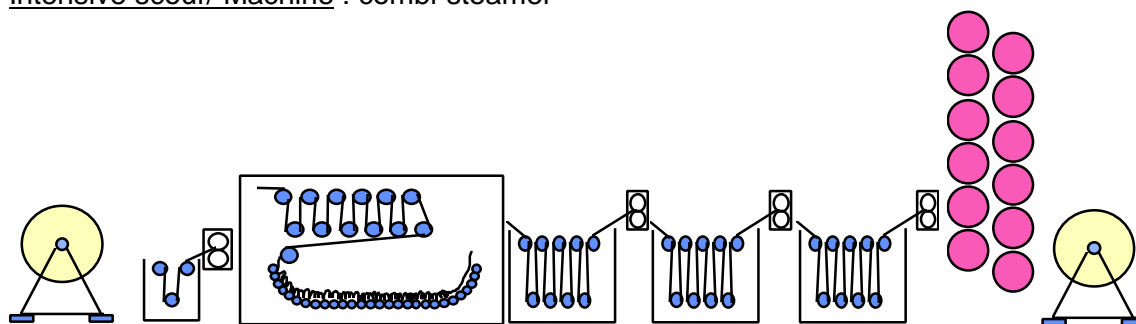
Cold pad-batch bleach/ Machine : impregnation unit



- |          |  |
|----------|--|
| 50 ml/l  | Hydrogen Peroxide 50%                                    |
| 50 g/l   | Caustic Soda 50%   |
| (10 ml/l | Sodium Silicate)   |
| 5 g/l    | <b>Prestogen<sup>0</sup> N-D</b>                         |
| 8 g/l    | <b>Kialon<sup>0</sup> N-DB or Kialon<sup>0</sup> MFB</b> |
| 3 g/l    | Persulfate   |
| 1 g/l    | <b>Multiplus<sup>0</sup> NB-100</b>                      |

- |                       |   |
|-----------------------|---|
| Pad bath temperature: | room temperature                                    |
| Wet Pick-up:          | 75 to 100%*   |
| Batch temperature:    | room temperature                                    |
| Batch time:           | 10-24 hours*  |
|                       | *(depending on fabric construction and fiber blend) |
| Washing temperature:  | at least 190°F                                      |

Intensive scour/ Machine : combi-steamer



- |                       |  |
|-----------------------|--|
| 80 g/kg               | Caustic Soda 50%   |
| 4 g/kg                | <b>Kialon<sup>0</sup> N-DB or Kialon<sup>0</sup> MFB</b> |
| Pad bath temperature: | room temperature   |
| Reaction temperature: | 212°C  |
| Reaction time:        | 15 min.  |

Washing temperature: at least 190°F

**Cold Pad-Batch Bleach Plus Bleach**

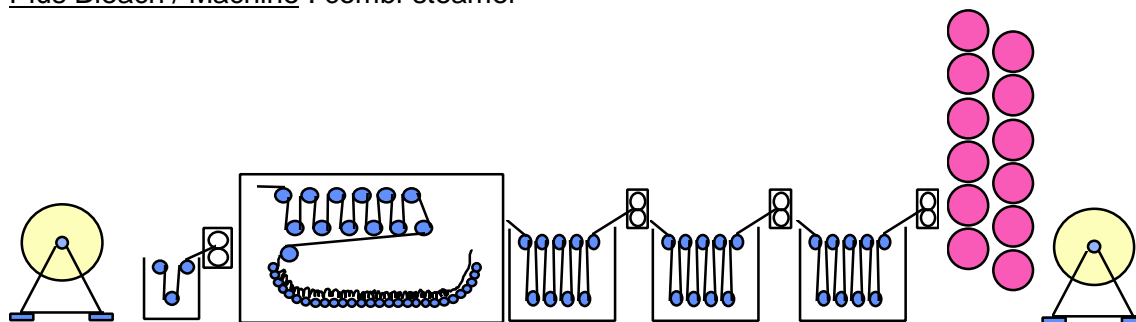
Cold pad-batch bleach/ Machine : impregnation unit



- |          |  |
|----------|--|
| 50 ml/l  | Hydrogen Peroxide 50%  |
| 50 g/l   | Caustic Soda 50%   |
| (10 ml/l | Sodium Silicate)   |
| 5 g/l    | <b>Prestogen<sup>0</sup> N-D</b>                             |
| 8 g/l    | <b>Kieralon<sup>0</sup> N-DB or Kieralon<sup>0</sup> MFB</b> |
| 3 g/l    | Persulfate   |
| 1 g/l    | <b>Multiplus<sup>0</sup> NB-100</b>                          |

- |                       |   |
|-----------------------|---|
| Pad bath temperature: | room temperature                                    |
| Wet Pick-up:          | 75 to 100%*   |
| Batch temperature:    | room temperature                                    |
| Batch time:           | 10-24 hours*  |
|                       | *(depending on fabric construction and fiber blend) |
| Washing temperature:  | at least 190°F                                      |

Plus Bleach / Machine : combi-steamer

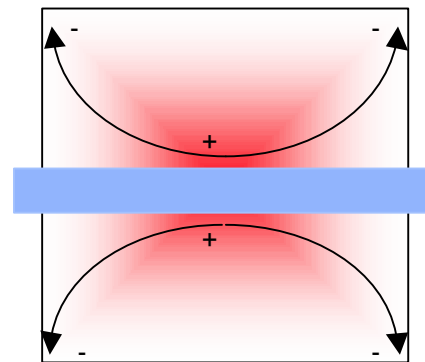
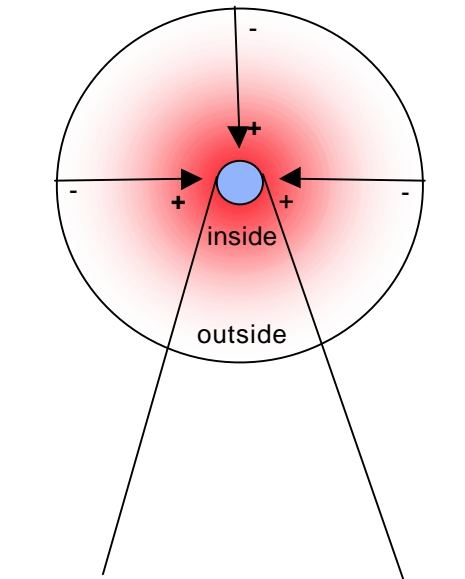


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|-----------------------|--|
| 20 ml/kg              | Hydrogen Peroxide 50%  |
| 10 g/kg               | Caustic Soda 50%   |
| 5 g/kg                | <b>Prestogen<sup>0</sup> N-D</b>                             |
| 3 g/kg                | <b>Kieralon<sup>0</sup> N-DB or Kieralon<sup>0</sup> MFB</b> |
| Pad bath temperature: | room temperature   |
| Reaction temperature: | 212°C  |
| Reaction time:        | 3-10 min.  |

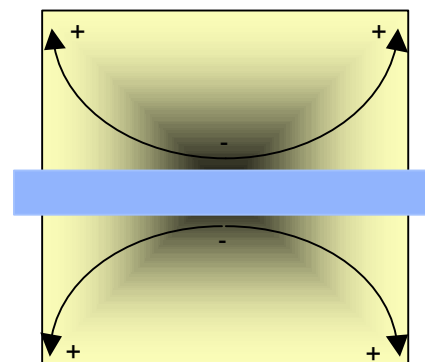
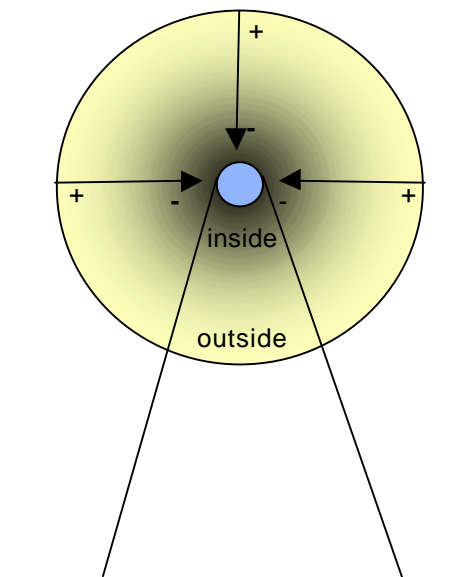
Washing temperature: at least 190°F



# Cold Pad Batch Bleach Defects



Temperature ° F variance



Residual peroxide%

## Safety

When using these products, the information and advice given in our Safety Data Sheet should be observed. Due attention should also be given to the precautions necessary for handling chemicals.

We know of no ill effects that could have resulted from using the mentioned products for the purpose for which it is intended and from processing it in accordance with current practice.

According to the experience that we have gained over many years and other information at our disposal, The products noted in this leaflet. do not exert any harmful effects on health, provided that it is used properly, due attention is given to the precautions necessary for handling chemicals, and the information and advice given in our Material Safety Data Sheet are observed.

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*Note: Material Safety Data Sheet is available upon request.*

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