Cold Pad Batch Dyeing
COLD PAD BATCH DYEING
ECONOMY and ECOLOGY

There are presently three main processes in use world wide for continuous dyeing of woven and knitted cellulosic fabrics;

- Pad batch or CPB process,
- Pad-dry thermofixing process,
- E-control process.

The first of these requires the smallest machine range, whilst the other two demand more complex ranges. COLD PAD BATCH dyeing is a more environmentally sound and higher quality dyeing method for woven and knitted cotton/viscose fibers. The process removes salt from the effluent, reduces the use of water, energy, reduces the volume of effluent and occupies less space on the production floor.

Benefits of CPB dyeing can be summarized as follows;

- Relatively low cost of equipment,
- Less surface area,
- Low amount of effluent,
- No salt residue in effluent water,
- Conventional exhaust dyeing system emits up to 1 kg salt per kg of fabric,
- Low steam consumption, 50 percent less,
- Low electricity requirement, 30 - 40 % less,
- Improved fabric quality,
- Reduced labor cost.
POINTS TO BE CONSIDERED

Machinery and Production Area, Laboratory

- Padding cylinders should be horizontally mounted.
- Padding trough should have small volume of 15 - 25 liters.
- For the cooling front and back side of entering fabric, two water cooled cylinder should be available.
- Padding trough should be clad in a cooling jacket to maintain a constant liquor temperature. Ideal temperature is around 22 - 23 °C.
- Lab. padder should be also horizontal and liquor should be placed between the nips of cylinders.
- Dyed lab. samples should be kept at the same temperature of production dwelling area.
- Dwelling area should be air conditioned and kept 3 - 5 °C above padder temp.
- Lab. padder and batching area should be away from sun shine, air current, chemical fumes.
- Dye/alkali supplying pump should run always at 4/1 ratio and be checked regularly.
- Batch rotation should be around 5 - 10 rpm.

FABRIC

- Fabrics should be uniformly bleached, and if possible mercerized.
- Absorbency should be high and be same along width of fabric.
- Fabric should be uniformly dried and cooled down prior to padding.
- Fabric stitching should not be overlapped.

DYE

- Dyes should have high solubility at room temperature water.
- Dyes should have similar substantivity in order to prevent tailing.
- Dyes should have similar reactivity to obtain excellent reproducibility.
- Dyes should have higher alkali stability to prevent hydrolyzation.
CHEMICALS

E WET ESC N: For uniform absorption of dye along with fabric, E WET ESC N is a powerful, foamless, alkali resistant penetrator. Usage amount is 1 - 3 g/L. It is silicon antifoam free.

ANTISIL ACC or ECO: In order to diminish calcium and silicate deposition on the fabric and cylinders, ANTISIL ACC/ECO is a strong sequestering and dispersing chemical. Application amount is 1 - 3 g/L.

PESCLEAN : In order to prevent agglomeration of dyes and hence dye spot problem, PESCLEAN is added into the dye solution. Recommended amount is 5 g/L. In case of Turquoise combinations, 10 g/L PESCLEAN is advised.

BUFFERON PB is a ready to use liquid alkali, composed of organic and inorganic buffers. Dyes are less sensitive to this product, as alkaline sensitivity. Hence batch to batch - tailing - left to right shade differences are invisible wash / rubbing fastness properties are enhanced.

Recipe :

A   BUFFERON PB

DYE    x    g/L
E WET ESC N     2 - 3    g/L

B

ANTISIL ACC/ECO  1 - 3    g/L
EXOLINE S4U     10 - 20 g/L
DWELLING TIME

Batching area should be conditioned kept at 3 - 5 °C above the padder temperature. Dwelling time varies according to the chemical reaction group of dye.

<table>
<thead>
<tr>
<th>Dye Group</th>
<th>Batching Time, h</th>
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<tbody>
<tr>
<td>BLACK DYES</td>
<td>6 - 8</td>
</tr>
<tr>
<td>VINYL SULFONE</td>
<td>12</td>
</tr>
<tr>
<td>BRILL.BLUE RSP</td>
<td>12</td>
</tr>
<tr>
<td>BIFUNCTIONAL DYES</td>
<td>12 - 16</td>
</tr>
<tr>
<td>GREY HFL</td>
<td>24</td>
</tr>
<tr>
<td>TURQUOISE DYE</td>
<td>24</td>
</tr>
</tbody>
</table>

Extension of dwelling time has no effect on the tone or yield of VIVIZOL dyes.

WASHING

For efficient washing of CPB dyed fabrics, 7 - 8 chamber washing tank is sufficient. In the first 2 - 3 tank, excess amount water is used, to remove silicate and drop the pH to 8 - 8,5. Temperature in these tanks should not be above, 50 °C. If pH does not drop or washing machine is short, it is wiser to wash rest of the chambers at 50 °C and in the second pass at boiling temperature.

1. Chamber 50 °C
2. Chamber 50 °C
3. Chamber 50 °C pH 8 - 8,5
4. Chamber 98 °C EXOLINE 3025 4-5 ml/L
5. Chamber 95 °C
6. Chamber 98 °C
7. Chamber 70 °C
8. Chamber 40 °C

VIVIZOL DYES FOR CPB SYSTEM

Since alkaline stability of vinyl sulfon dyes is rather low, we prefer VIVIZOL bifunctional reactive dyes for CPB dyeing reproducibility ratio is much higher and washing off property is superior. We recommend the following VIVIZOL range for CPB dyeing;

Light Shades
VIVIZOL YELLOW HFL
VIVIZOL RED HFL
VIVIZOL BLUE HFL
VIVIZOL GREY HFL

Medium-Dark Shades
Bestcom Range
VIVIZOL DBR Range

Additionally
VIVIZOL TURQUOISE BLUE 266%
VIVIZOL BRILL.BLUE RSP
VIVIZOL Black Dyes

Solubility of BRILL.BLUE R SP and TURQUOISE BLUE 266% is superior in presence of alkali.