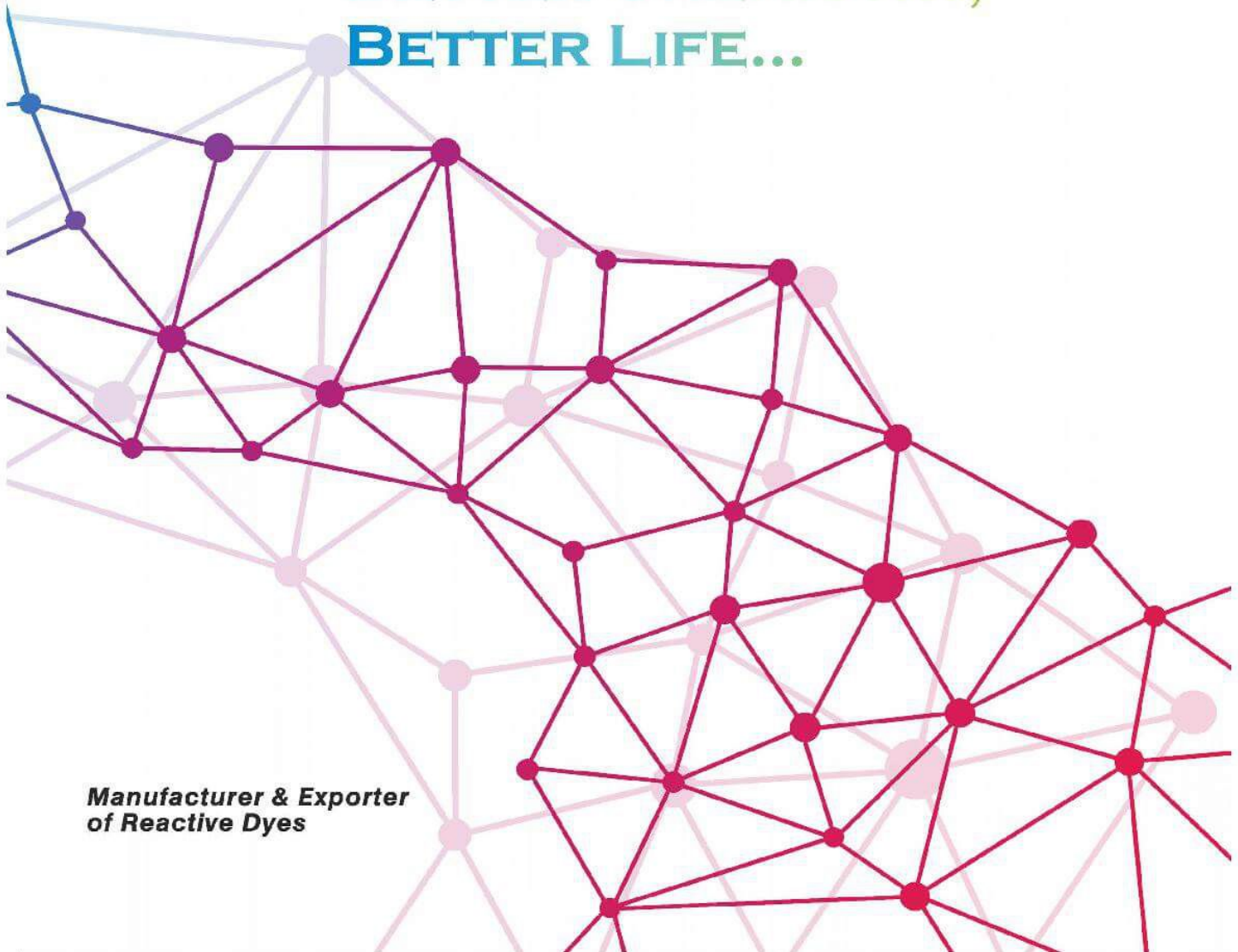




**BETTER CHEMISTRY,  
BETTER LIFE...**

**Manufacturer & Exporter  
of Reactive Dyes**





## ***EPSILON 'E' Series of Reactive Dyes***

To implement Blind Dyeing Concept of Reactive Dyeing in Light to Medium Shades with excellent build-up, our Epsilon 'E' Series Reactive Dyes, being Spray Dried R/O products with minimal salt content, offer prudent solutions for Dye Houses. The performances of the products usually match the specifications set by International Retailers and Buying Houses like – Walmart, Gap, Adidas, Nike, Tommy Hilfiger, J.C. Penny, M & S, Inditex, H & M and so on.

### ***Salient Features of Epsilon 'E' Reactive Dyes***

- Highly compatible range over a wide spectrum of shades.
- Robustness in dyebath by achieving excellent reproducibility and consistency.
- Right profile with respect to exhaustion, diffusion and fixation to balance cost and performance.
- Least sensitive to minor processing variables when used in combinations.
- Excellent wash-off properties, thereby reducing ecological costs and improving productivity.
- Very good leveling properties due to high fixation yield and excellent migration behavior.
- High Chlorine, Perspiration and Wet Light Fastness.
- Good Oxidative Wash Fastness (Multiple Wash Cycles).
- High Fastness to Post Mercerization.
- Meets the most stringent of Fastness to Light.
- High performance Non Flaring properties in different illuminants.
- Satisfies the requirements set by major ecological standards.

## Exhaust Dyeing

The process application adopted for Epsilon 'E' Reactive Dyes exhibit level dyeing with excellent reproducibility due to dependence on dyeing parameters and high fixation behavior, thereby, easy to operate and control in dye house with minimum manual intervention.

The Dyeing Methods adopted depends exclusively on the type of substrate, shade and machinery available.

The starting dyebath pH is set between 5.5 and 6.5 by using adequate quantity of Acetic Acid.

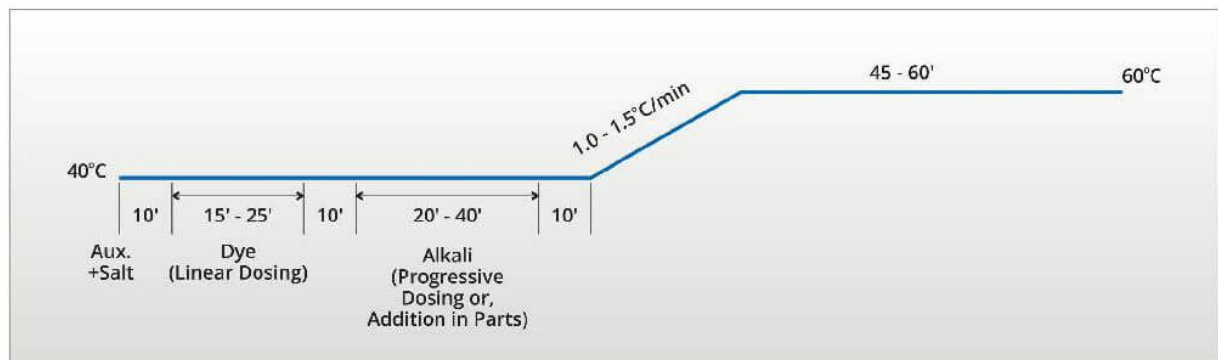
**A general recipe for Dyebath Assistants during dyeing process with water of minimum hardness will be:**

Acetic Acid	0.30 to 0.50 gpl
Sequestering Agent	0.50 to 1.00 gpl
Defoaming Agent	0.10 to 0.30 gpl
Lubricating Agent	0.25 to 0.40 gpl
Tri Sodium Phosphate	0.20 to 0.25 gpl

## Dyeing Method

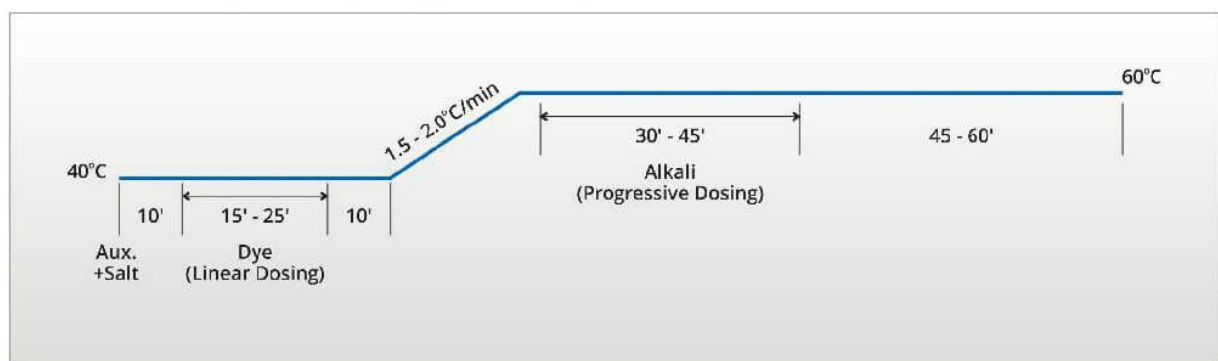
### I) All-In-One Method:

This method provides better levelness when difficult to obtain, esp. with darker shades.



### II) For Highly Absorbent Cellulosic Substrate:

This is versatile method suitable for highly absorbent cellulosic material.





**Salt and Alkali Requirement & Fixation Time During Exhaust Dyeing:**

Liquor Ratio 10:1			0.01 to 0.5	0.5 to 1.0	1.0 to 2.0	2.0 to 3.0	3.0 to 4.0	4.0 & Above
Salt (gpl)	Unmercerized Cotton		20	30	40	50	60	70
	Mercerized Cotton		10	20	30	40	50	60
	Soda Ash		10	15	20	20	20	20
Alkali (gpl)	Mixed	Soda Ash	★	★	8	8	8	10
	Alkali	Caustic Soda	★	★	1.0	1.0	1.0	1.5
Fixation Time (Min.)			30	45	60	60	60	70

★ = Not Recommended

**Notes:**

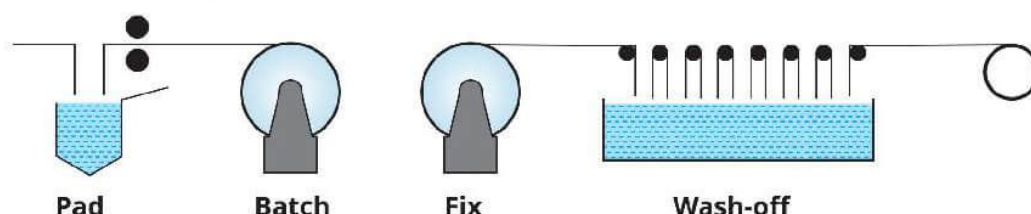
- Glauber's Salt is recommended as electrolyte(Salt) for dyeing self shade or shade based on Turquoise .
- Soda Ash is always the preferred alkali, however to reduce the amount of handling, the mixed alkali(Soda Ash & Caustic) can be used especially in dark shades.
- Caustic Soda used in mixed alkali should be originally in the flakes form.
- In case of dyeing of regenerated cellulosic, like-Viscose, Mixed Alkali should always be avoided.

**Washing Off Process of Epsilon 'E' Reactive Dyes During Exhaust Dyeing**

On completion of the Dyeing Cycle, washing off steps to be followed are as:

- Cold Wash with Overflow for 10 minutes.
- Hot Wash at 80°C for 10 minutes.
- Neutralization with Acetic Acid.
- Soaping with 1-2 gpl Non-Ionic Soaping Agent and 0.50 gpl of Sequestering Agent at 90°C for 10 minutes.
- Hot Wash for 10 minutes at 80°C.
- Cold Rinse.
- For maximum wet fastness properties for dark to heavy dark shades, additional soaping and hot wash may be repeated before final cold rinse.
- Hot or cold rinse is necessary till final clear solution is obtained.

## Cold Pad Batch System



### Application Procedure

#### Sodium Silicate Method

##### Description

This is the most commonly adopted method by the Process Houses for application of Epsilon 'E' Reactive Dyes. The general approach is to apply the dye at neutral pH and after distribution of the dye on the substrate, the pH is raised for fixation.

#### Padding Liquor Recipe

##### (A) Dyestuff Solution

COMPOSITION OF DYESTUFF SOLUTION	QUANTITY (GPL)
Cronus™ 'X' Reactive Dye	X GPL
Wetting-cum-Penetrating Agent	1-2 GPL
Antimigration Agent	2-4 GPL
Sequestering-cum-Dispersing Agent	1-2 GPL
Urea	30-40 GPL (Upto 20 GPL Shades) 50-80 GPL (Above 20 GPL Shade)

##### (B) Silicate / Caustic Solution

	Amount of Epsilon 'E' Reactive Dyes			
	<20 gpl	20gpl - 40 gpl	40 gpl - 70 gpl	>70 gpl
Na <sub>2</sub> SiO <sub>3</sub> (48 - 50° Be)	Amount of Caustic Soda Solution 35.5% w/w (38° Be) in cc/l required in addition to Sodium Silicate			
100 gpl	15 cc/l	20 cc/l	25 cc/l	30 cc/l

##### Notes:-

- Only necessary amount of boiling water is used for dissolution of dyestuff. Further dilution is done by cold water.
- Urea is sprinkled in solid form into the cooled liquor and dissolved by stirring. Temperature of dye solution should not be above 40°C at the time of adding urea.
- A/B ratio should be 4:1 in the padding bath and to be added through dosage pump.

**Padding:**

- Uniformly cooled fabric is padded at about 25-30°C.
- Padding trough should be of smaller capacity of 15-25 litres due to high fabric speed and frequent replenishment.
- Fabric pick-up should be about 60-70% for cotton and 90-100% for viscose fabrics.
- Quantity of ready-to-pad fabric and speed of the Padding Mangle to be kept at a higher speed, so that the Dye Solution is used up within 15-20 minutes.

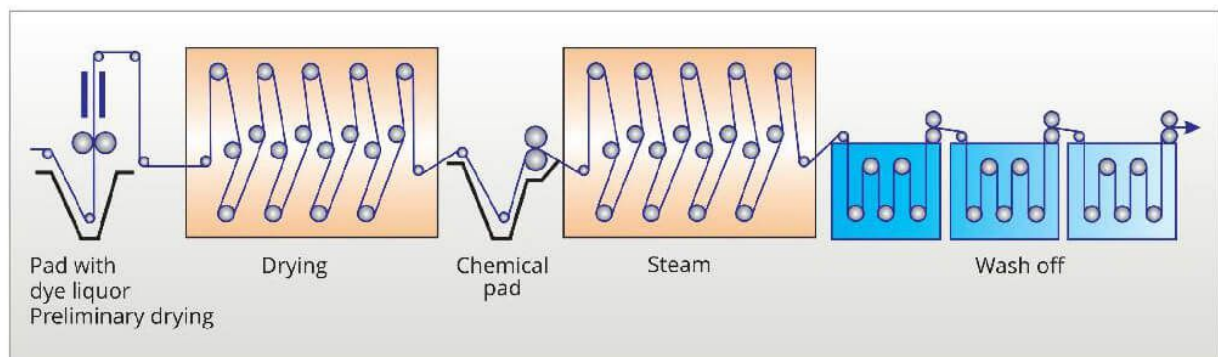
**Fixation:**

- On padding, fabric roll is covered with plastic sheet to protect the padded goods from partial drying and is made to rotate at around 5-10 rpm.
- Fixation time is 8-10 hours, however, for shades like-Turquoise the recommended time is 16-18 hours.

**Washing-Off:**

- Can be carried out on any suitable machine, say, Jigger, Winch or Open-width Soaper.
- For efficient washing off of dyed fabric, 7-8 chamber washing tank is suggestive. In the first 2-3 chambers, excess amount of water is used, to remove Silicate and to drop pH to 8.0-8.5. Temperature in these tanks should not be above 50°C.
- From 4th to 6th chamber, temperature is maintained at 98°C with soaping agent being added in 4th chamber.
- Temperature can be dropped down to 70°C in 7th Chamber and 40°C in the last chamber.

**Continuous Dyeing Using Pad-Dry-Pad-Steam Process**





### Dye Liquor Pad

Epsilon 'E' Dye	x gpl
Wetting-cum-Penetrating Agent	2-3 gpl
Migration Inhibitor	10-15 gpl
Mild Oxidising Agent	5-10 gpl

Liquor Pick-up : 60-80%

Padding Temperature : <35 °C

**Intermediate Drying** : To be done at 100 - 110 °C

### Chemical Pad

Soda Ash	20 gpl
Caustic Soda (38 ° Be)	10 ml/l
Common Salt	200 gpl

**OR**

Sodium Silicate (1:2.5) (48-50 ° Be)	70%
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Liquor Pick-up : 60-80%

Padding Temperature : <35 °C



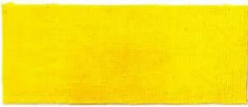











**Steaming** : To be done in Saturated Steam ( 101 - 105 °C) for 45 – 90 seconds

### Washing

Overflow Cold Rinse	30-40°C
Neutralization	30-40°C
Warm Rinse	50-60°C
Hot Rinse	70-80°C
Soaping (With 1-2 gpl Soaping Agent)	95-98°C
Warm Rinse	50-60°C
Cold Rinse	30-40°C



#### **IMPORTANT:**

*The following supersedes the Buyer's documents. This is intended to service as non-binding guidelines. Seller makes no representation or warranty, expressed or implied, including the fitness for a particular purpose. Data and results are based on controlled lab conditions and must be confirmed by Buyer by testing for the intended conditions of use.*







			Solubility(g/l) @ 50°C		Applications		
			Salt-Free Neutral Water	30 gpl Common Salt	Exhaust	Cold Pad Batch	Pad-Dry-Pad-Steam
<b>EPSILON 'E' SERIES REACTIVE DYES</b>							
0.5%	2%	SHADE					
		EPSILON LEMON E4GL	120	70	R	R	R
		EPSILON YELLOW ERGL	160	50	R	R	R
		EPSILON ORANGE ERGL	150	110	R	R	R
		EPSILON SCARLET ERGL	130	100	R	R	NR
		EPSILON BRILLIANT RED E2RL	150	120	R	R	R
		EPSILON RED ERGL	175	125	R	R	R
		EPSILON RED E2GL	175	125	R	R	NR

Dischargeability (Alkaline Discharge)	Fixation Temperature (°C)	FASTNESS PROPERTIES												
		AATCC 16E (20AFU)	Chlorinated Water (20 ppm Active Chlorine)	WASHING				CROCKING		PERSPIRATION (ISO 105-E04)				
				ISO 105-E03		ISO 105-C06-C2S, @ 60°C		AATCC TM 61-3A, @ 71°C		ISO 105-X12		Acidic		Alkaline
		Light 1/3 S/D	Shade Change	Shade Change	Staining Cotton	Shade Change	Staining Cotton	Dry	Wet	Shade Change	Staining Cotton	Shade Change	Staining Cotton	
R	60	4-5	4	4-5	4	4-5	4-5	4-5	4-5	4	4-5	4-5	4-5	4-5
NR	60	4	4	4-5	4-5	4-5	4-5	4-5	4	4-5	4-5	4-5	4-5	4-5
NR	60	4	4	4-5	4	4-5	4	4-5	3-4	4-5	4	4-5	4	4
NR	60	3-4	4	4	4	4-5	4	4-5	4	4	4	4	4	4
R	60	4	4	4-5	4-5	4-5	4-5	4-5	4	4-5	4-5	4-5	4-5	4-5
NR	60	3-4	4	4-5	4-5	4-5	4-5	4-5	4	4-5	4-5	4-5	4-5	4-5
R	60	4	4-5	4-5	4-5	4-5	4-5	4-5	4	4-5	4-5	4-5	4-5	4-5



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<b>EPSILON 'E' SERIES REACTIVE DYES</b>							
0.5%	2%	SHADE					
		EPSILON RED E4BL	160	120	R	R	R
		EPSILON ROYAL ERGL	100	80	R	R	NR
		EPSILON BRILLIANT BLUE E2RL	150	120	R	R	R
		EPSILON BLUE ERGL	120	50	R	R	R
		EPSILON ADMIRAL ERGL	125	90	R	R	R
		EPSILON NAVY ERGL	175	125	R	R	R
		EPSILON TURQUOISE ERGL	150	110	R	R	NR

Dischargeability (Alkaline Discharge)	Fixation Temperature (°C)	FASTNESS PROPERTIES												
		AATCC 16E (20AFU)	Chlorinated Water (20 ppm Active Chlorine)	WASHING				CROCKING		PERSPIRATION (ISO 105-E04)				
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		Light 1/3 S/D	Shade Change	Shade Change	Staining Cotton	Shade Change	Staining Cotton	Dry	Wet	Shade Change	Staining Cotton	Shade Change	Staining Cotton	
R	60	4-5	2-3	4-5	4-5	4-5	4-5	4-5	4-5	4	4-5	4-5	4	4-5
NR	60	4-5	2	4-5	4-5	4-5	4	4-5	4	4-5	4-5	4-5	4-5	4-5
R	60	4-5	4	4-5	4-5	4-5	4	4-5	4-5	4-5	4-5	4-5	4-5	4-5
NR	60	4-5	4	4-5	4-5	4-5	4-5	4-5	4	4-5	4-5	4-5	4-5	4-5
R	60	3-4	4-5	4-5	4-5	4-5	4-5	4	3-4	4-5	4-5	4-5	4-5	4-5
R	60	4	4-5	4-5	4-5	4-5	4-5	4-5	4	4-5	4-5	4-5	4-5	4-5
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			Solubility(g/l) @ 50°C		Applications		
			Salt-Free Neutral Water	30 gpl Common Salt	Exhaust	Cold Pad Batch	Pad-Dry-Pad-Steam
<b>EPSILON 'E' SERIES REACTIVE DYES</b>							
0.5%	2%	SHADE					
		EPSILON ONYX BLACK E5GL	180	130	R	R	R
		EPSILON ONYX BLACK E5RL	160	125	R	R	R
		EPSILON BLACK ERGL	150	125	R	R	R

R = Recommended NR = Not Recommended

Dischargeability (Alkaline Discharge)	Fixation Temperature (°C)	FASTNESS PROPERTIES												
		AATCC 16E (20AFU)	Chlorinated Water (20 ppm Active Chlorine)	WASHING				CROCKING		PERSPIRATION (ISO 105-E04)				
				ISO 105-E03		ISO 105-C06-C2S, @ 60°C		AATCC TM 61-3A, @ 71°C		ISO 105-X12		Acidic		Alkaline
		Light 1/3 S/D	Shade Change	Shade Change	Staining Cotton	Shade Change	Staining Cotton	Dry	Wet	Shade Change	Staining Cotton	Shade Change	Staining Cotton	
R	60	3-4	3	4-5	3-4	4-5	3-4	4-5	4-5	3-4	4-5	4-5	4-5	4-5
R	60	3-4	3	4-5	4-5	4-5	4	4-5	3-4	4-5	4-5	4-5	4-5	4-5
R	60	3-4	4	4-5	4-5	4-5	4-5	4	3-4	4-5	4-5	4-5	4-5	4-5

Pattern Illustration : On Bleached Cotton by Exhaust Process



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