


*Exhaust Dyeing Methods*

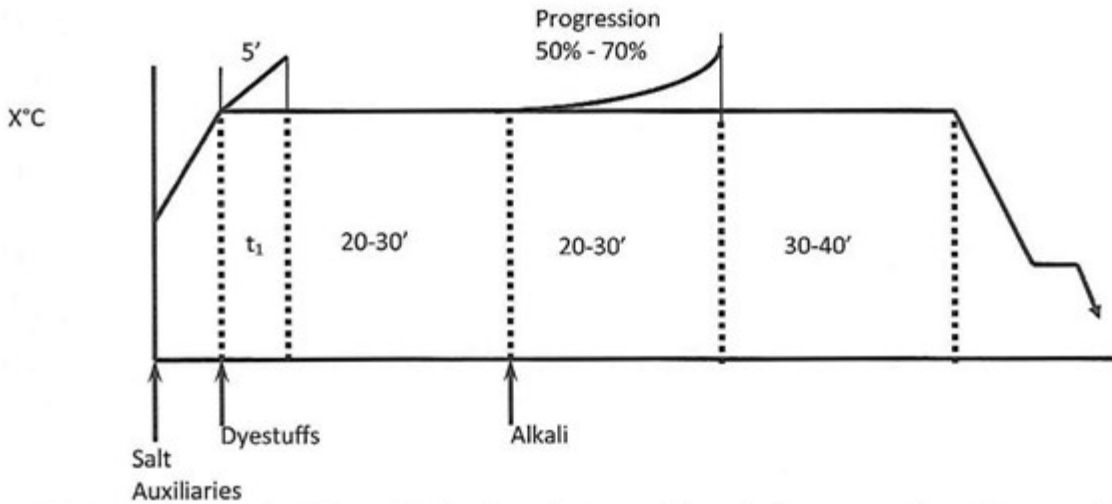
**1. Exhaust dyeing of cotton with Sumifix, Sumifix Supra, Sumireact Supra and Sumifix HF dyes.**

**1-(1) Isothermal dyeing methods**

Apparatus	 <p style="text-align: center;">Overflow jet dyeing machine</p>	Others: Winch dyeing machine Package dyeing machine Hank dyeing machine Beam dyeing machine
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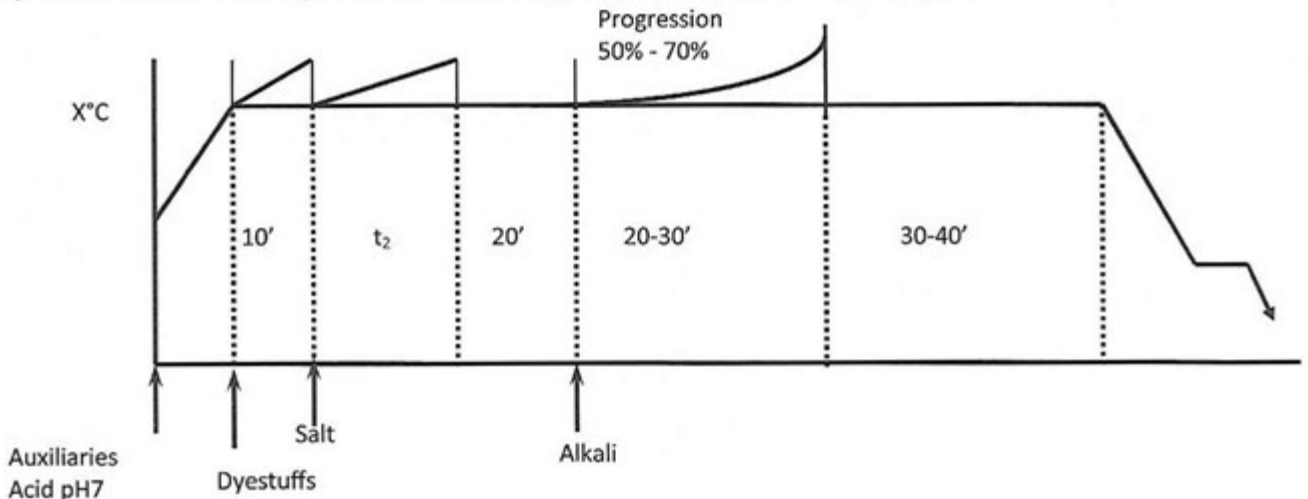
**1A. "SALT FIRST" method (Best choice for Medium to Deep shades)**

Moderate Substantivity, Moderate reactivity, Easy and reproducible, all non mercerised cotton



**1B. "SALT SECOND" method (Good choice for pale to Medium shades or very short liquor ratio)**

Very Moderate Substantivity, Moderate reactivity, Easy and reproducible, all cottons



X°C: 60°C for Sumifix Supra, Sumireact Supra, Sumireact Supra S-HBU and Supra E-XF dyes

X°C = 70-80°C for Sumifix HF dyes

X°C = 50°C for Sumifix Black dyes and Sumireact Jet Black S-PX

**(Add preferably salt at 60°C after dyestuff in case of pale shades (~1.0%) and regenerated cellulose,**

Remarks	<p>t<sub>1</sub>: this time can be determined by calculating: 2 or 3 rotations of material in jet or winch dyeing machine or 2 or 3 circulations of dye bath in package dyeing machine</p> <p>t<sub>2</sub>: this time can be determined by calculating: 5 or 7 rotations of fabric/knit in jet or winch dyeing machine 5 or 7 circulations of dye bath in package dyeing machine</p>
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### 1-(2) High Temperature migration dyeing method

Apparatus



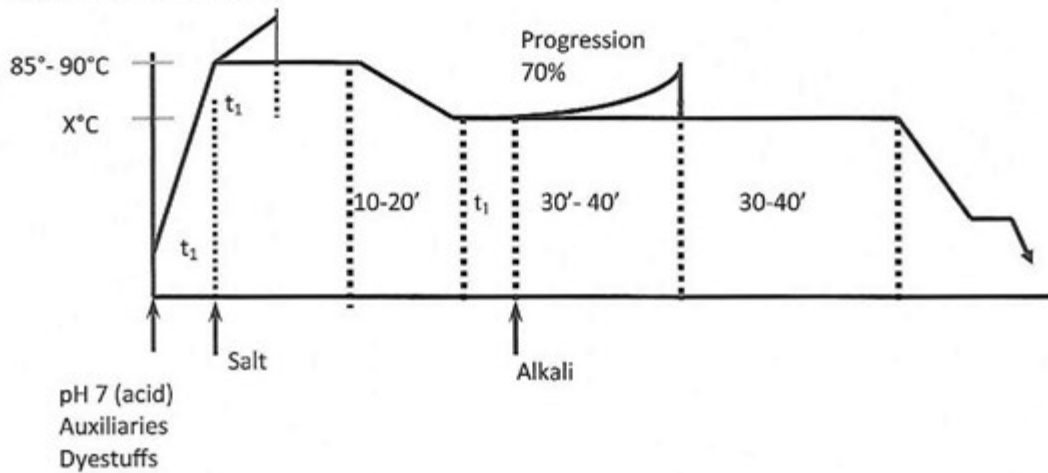
Overflow jet dyeing machine

Others:

- Winch dyeing machine
- Package dyeing machine
- Cheese dyeing machine

Migration method (Best levelling on viscose, viscose Lycra, Tencel, ...)

Low substantivity, Moderate reactivity

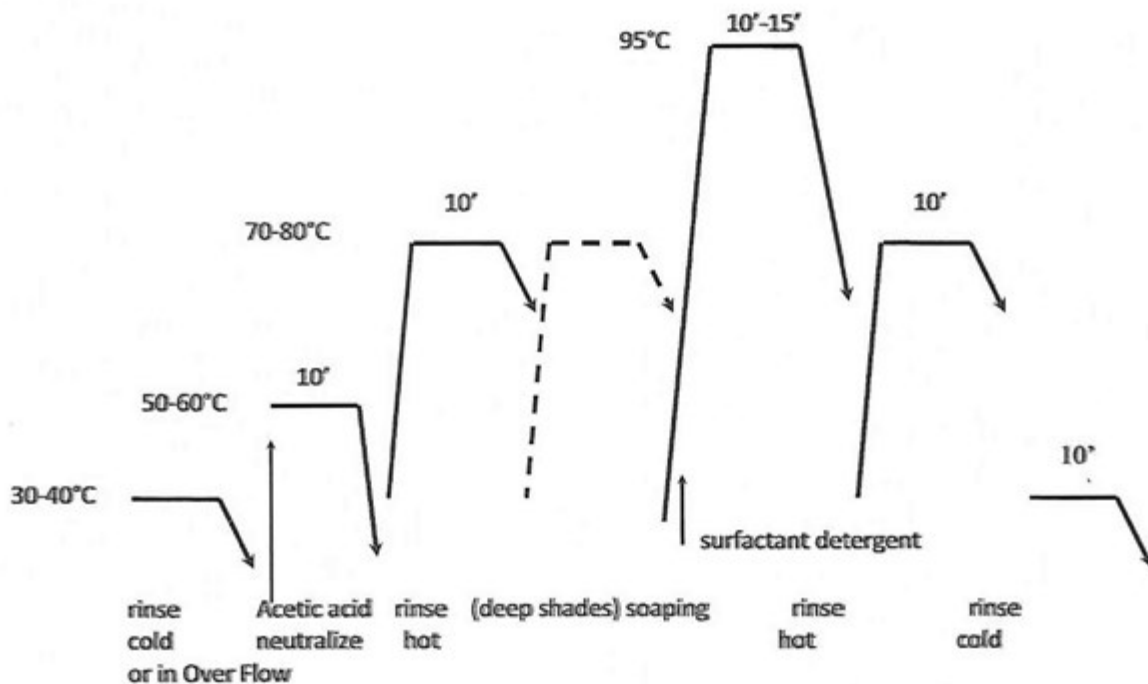


X°C: 60°C for Sumifix Supra and Supra E-XF dyes, 70°C for Sumifix HF dyes

Remarks

t<sub>1</sub>: this time can be determined by calculating:  
2or 3 rotations of material in jet or winch dyeing machine or  
2 or 3 circulations of dye bath in package dyeing machine

Rinsing – Soaping



## Dosage of Salt and Alkali for exhaust dyeing

**LR:> 5:1: Sumifix, Sumifix Supra, Sumifix Supra E-XF, Sumireact Supra S-PX dyes**

Dyes	Unmercerized cotton				Mercerized Cotton				Prompt Viscose			
	Salt	Soda ash	Soda ash +Caustic soda (38°Bé)		Salt	Soda ash	Soda ash +Caustic soda (38°Bé)		Salt	Soda ash	S.Bi-carbonate + Soda Ash anh.	
			Na <sub>2</sub> CO <sub>3</sub> (g/l)	NaOH (ml/l)			Na <sub>2</sub> CO <sub>3</sub> (g/l)	NaOH (ml/l)			NaHCO <sub>3</sub> (g/l)	Na <sub>2</sub> CO <sub>3</sub> (g/l)
(% o.w.f)	(g/l)	(g/l)	(g/l)	(ml/l)	(g/l)	(g/l)	(g/l)	(ml/l)	(g/l)	(g/l)	(g/l)	(g/l)
0.00-0.19	12	10	10	0	8	8	8	0	8	8	0	8
0.20-0.39	20	12	12	0	15	10	10	0	15	10	0	10
0.40-0.59	30	15	5	0.5	25	15	15	0	25	10	0.5	14
0.60-0.79	40	20	5	0.75	30	20	5	0.50	30	15	0.5	14
0.80-1.29	50	20	5	1.00	40	20	5	0.75	40	15	1.0	16
1.30-2.25	60	20	5	1.25	50	20	5	1.00	50	15	1.5	18
2.25-2.99	70	20	5	1.50	55	20	5	1.25	55	15	2	20
3.00-3.99	80	20	5	1.75	60	20	5	1.50	60	15	2	20
4.00-5.99	90	20	5	2.00	65	20	5	1.75	65	15	2.5	20
≥6.00	100	20	5	2.50<	70<	20	5	2.00<	70<	15	2.5	20

**LR: ≤ 5:1 Sumifix, Sumifix Supra, Sumifix Supra E-XF, Sumireact Supra S-PX dyes**

Dyes	Unmercerized cotton				Mercerized cotton				Prompt Viscose			
	Salt	Soda ash	Soda ash +Caustic soda (38°Bé)		Salt	Soda ash	Soda ash +Caustic soda (38°Bé)		Salt	Soda ash	S.Bi-carbonate + Soda Ash anh.	
			Na <sub>2</sub> CO <sub>3</sub> (g/l)	NaOH (ml/l)			Na <sub>2</sub> CO <sub>3</sub> (g/l)	NaOH (ml/l)			NaHCO <sub>3</sub> (g/l)	Na <sub>2</sub> CO <sub>3</sub> (g/l)
(% o.w.f)	(g/l)	(g/l)	(g/l)	(ml/l)	(g/l)	(g/l)	(g/l)	(ml/l)	(g/l)	(g/l)	(g/l)	(g/l)
0.00-0.19	8	15	15	0	5	10	10	0	5	10	0	8
0.20-0.39	14	17	20	0	11	15	15	0	11	15	0	10
0.40-0.59	21	20	5	0.60	18	17	17	0	18	17	0.5	14
0.60-0.79	28	20	5	0.90	21	20	5	0.60	21	20	0.5	14
0.80-1.29	35	20	5	1.20	28	20	5	0.90	28	20	1.0	16
1.30-2.25	42	20	5	1.50	35	20	5	1.20	35	20	1.5	18
2.25-2.99	49	20	5	1.80	39	20	5	1.50	39	20	2	20
3.00-3.99	56	20	5	2.10	42	20	5	1.80	42	20	2	20
4.00-5.99	63	20	5	2.40	46	20	5	2.10	46	20	2.5	20
≥ 6.00	70	20	5	3.00<	50<	20	5	2.40<	50<	20	2.5	20

**LR:> 5:1 Sumireact Supra S-HBU**

Dyes	Unmercerized cotton				Mercerized Cotton			
	Salt	Soda ash	Soda ash +Caustic soda (38°Bé)		Salt	Soda ash	Soda ash +Caustic soda (38°Bé)	
			Na <sub>2</sub> CO <sub>3</sub> (g/l)	NaOH (ml/l)			Na <sub>2</sub> CO <sub>3</sub> (g/l)	NaOH (ml/l)
(% o.w.f)	(g/l)	(g/l)	(g/l)	(ml/l)	(g/l)	(g/l)	(g/l)	(ml/l)
0.00-0.19	8	10	10	0	5	8	8	0
0.20-0.39	14	12	12	0	10	10	10	0
0.40-0.59	20	15	5	0.5	15	12	5	0.5
0.60-0.99	30	20	5	0.75	20	15	5	0.5
1.00-1.99	40	20	5	1.00	30	20	5	0.75
2.00-2.99	50	20	5	1.25	40	20	5	1.0
3.00-3.99	60	20	5	1.50	50	20	5	1.25
4.00-4.99	70	20	5	1.75	60	20	5	1.50
5.00-5.99	80	20	5	2.00	70	20	5	1.75
≥ 6.00	80	20	5	2.50<	70	20	5	2.0

Important: These salt and alkali concentrations are indications that should be optimised on site, depending on the local dyeing conditions and, in particular, the bi-carbonate content of the process water.

Glauber's salt ought to be used, when dyeing with Sumifix Supra Turquoise Blue BGF(N), Sumireact Turquoise Blue G Conc., Sumifix Br. Blue R, Sumifix Supra Blue BRF 150% and Sumireact Supra Sky Blue S-PX.

## Dosage of Salt and Alkali for exhaust dyeing

**Sumifix HF LR: > 5:1**

Dyes	Unmercerized cotton				Mercerized Cotton				Prompt Viscose			
	Salt	Soda ash	Soda ash +Caustic soda (38°Bé)		Salt	Soda ash	Soda ash +Caustic soda (38°Bé)		Salt	Soda ash	S.Bi-carbonate + Soda Ash anh.	
			Na <sub>2</sub> CO <sub>3</sub> (g/l)	NaOH (ml/l)			Na <sub>2</sub> CO <sub>3</sub> (g/l)	NaOH (ml/l)			NaHCO <sub>3</sub> (g/l)	Na <sub>2</sub> CO <sub>3</sub> (g/l)
(% o.w.f)	(g/l)	(g/l)	(g/l)	(ml/l)	(g/l)	(g/l)	(g/l)	(ml/l)	(g/l)	(g/l)	(g/l)	(g/l)
0.00-0.19	5	10	10	0	3	5	7	0	3	3	0.5	3
0.20-0.39	7	12	12	0	5	5	10	0	5	5	1	4
0.40-0.59	10	15	15	0	8	10	12	0	8	10	1	5
0.60-0.79	15	17	5	0.25	11	10	5	0.25	11	10	1.5	6
0.80-0.99	20	20	5	0.5	14	10	5	0.5	14	10	2	8
1.00-1.29	25	20	5	0.75	17	10	5	0.75	17	10	2	9
1.30-1.59	30	20	5	1	20	10	5	1	20	10	2	10
1.60-1.99	35	20	5	1.25	22	10	5	1.25	22	10	2	11
2.00-2.49	40	20	5	1.5	25	10	5	1.5	25	10	2	12
2.50-2.99	45	20	5	1.75	28	10	5	1.75	28	10	2	13
3.00-3.49	50	20	5	2	30	10	5	2	30	10	2.5	14
3.50-3.99	55	20	5	2.1	33	15	5	2.1	33	15	2.5	15
4.00-4.49	60	20	5	2.2	37	15	5	2.2	37	15	2.5	16
4.50-4.99	65	20	5	2.3	40	15	5	2.3	40	15	2.5	17
5.00-5.99	70	20	5	2.5	45	15	5	2.5	45	15	2.5	18
6.00-6.99	75	20	5	2.75	50	15	5	2.75	50	15	2.5	20
≥7.00	80	20	5	3	55	15	5	3	55	15	2.5	20

Important: These salt and alkali concentrations are indications that should be optimised on site, depending on the local dyeing conditions and, in particular, the bi-carbonate content of the process water.

**Sumifix HF LR: ≤ 5:1**

Dyes	Unmercerized cotton				Mercerized cotton				Prompt Viscose			
	Salt	Soda ash	Soda ash +Caustic soda (38°Bé)		Salt	Soda ash	Soda ash +Caustic soda (38°Bé)		Salt	Soda ash	S.Bi-carbonate + Soda Ash anh.	
			Na <sub>2</sub> CO <sub>3</sub> (g/l)	NaOH (ml/l)			Na <sub>2</sub> CO <sub>3</sub> (g/l)	NaOH (ml/l)			NaHCO <sub>3</sub> (g/l)	Na <sub>2</sub> CO <sub>3</sub> (g/l)
(% o.w.f)	(g/l)	(g/l)	(g/l)	(ml/l)	(g/l)	(g/l)	(g/l)	(ml/l)	(g/l)	(g/l)	(g/l)	(g/l)
0.00-0.19	3	10	10	0	2	5	7	0	2	3	0.5	3
0.20-0.39	5	12	12	0	4	5	10	0	4	5	1	4
0.40-0.59	7	15	15	0	6	10	12	0	6	10	1	5
0.60-0.79	10	17	5	0.25	8	10	5	0.25	8	10	1.5	6
0.80-0.99	14	20	5	0.5	10	10	5	0.5	10	10	2	8
1.00-1.29	18	20	5	0.75	12	10	5	0.75	12	10	2	9
1.30-1.59	21	20	5	1	14	10	5	1	14	10	2	10
1.60-1.99	25	20	5	1.25	16	10	5	1.25	16	10	2	11
2.00-2.49	28	20	5	1.5	18	10	5	1.5	18	10	2	12
2.50-2.99	32	20	5	1.75	20	10	5	1.75	20	10	2	13
3.00-3.49	35	20	5	2	22	10	5	2	22	10	2.5	14
3.50-3.99	39	20	5	2.1	24	15	5	2.1	24	15	2.5	15
4.00-4.49	42	20	5	2.2	26	15	5	2.2	26	15	2.5	16
4.50-4.99	45	20	5	2.3	28	15	5	2.3	28	15	2.5	17
5.00-5.99	49	20	5	2.5	31	15	5	2.5	31	15	2.5	18
6.00-6.99	53	20	5	2.75	34	15	5	2.75	34	15	2.5	20
≥7.00	56	20	5	3	38	15	5	3	38	15	2.5	20

Important: These salt and alkali concentrations are indications that should be optimised on site, depending on the local dyeing conditions and, in particular, the bi-carbonate content of the process water.

Glauber's salt ought to be used when dyeing with Sumifix HF Blue 2R and Sumireact HF Turquoise Blue G