

# Preliminary Study on Multi purpose After-treatment system for Digital Textile Printing

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## 1. INTRODUCTION

Digital textile printing(DTP) is becoming more important because production system of conventional textile printing is changing to multi items and small lot. And DTP is appropriate for quick response system(QRS). Recently, increasing availability of DTP is closely connected with high value added fashion industry. Delivery is very fast from sample order to main work with DTP. Fashion items of high price are mainly silk and cotton. DTP of these two fiber materials is accompanied certainly with steaming as after-treatment process for coloration. Role of steam is like water in exhaustion dyeing. Steam can diffuse dye or ink in printing paste to fiber. Quality of DTP fashion items depend on steaming. Current production amount of DTP is smaller than conventional textile printing. However conventional steamer is using so far, which is mismatched with DTP in terms of process efficiency, spot work of small lot, quality control. Therefore steamer for DTP is developed in order to improve efficiency of DTP process. Additionally, washing and drying process can carry out with same M/C after steaming.

## 2. EXPERIMENTAL

### 2.1.Design of multi-purpose after treatment for DTP

- Composition of steamer
  - Main body, vacuum pump, fabric roller and carrier, valves, etc
- Capacity
  - Below 100yds
- Washing method
  - Water supply to inside of carrier using pump
- Dehydration
  - Using vacuum pump for fast drying
- Drying method
  - Using hot air, separation of water and vapor

### 2.2. Washing method

- Operation of pump to supply water
- Water supply to carrier
- Washing from inside rolled fabric to outside

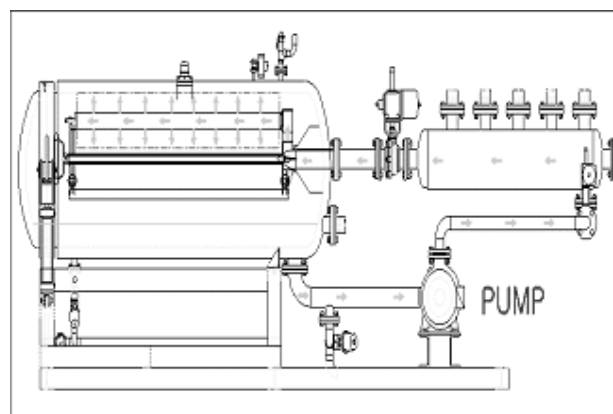


Fig. 1. Water flow in washing process.

### 2.3. Drying method

- Operation of fan and heater to supply hot air
- Separation of . moisture and air in chamber
- Hot air supply to carrier
- Drying from inside rolled fabric to outside

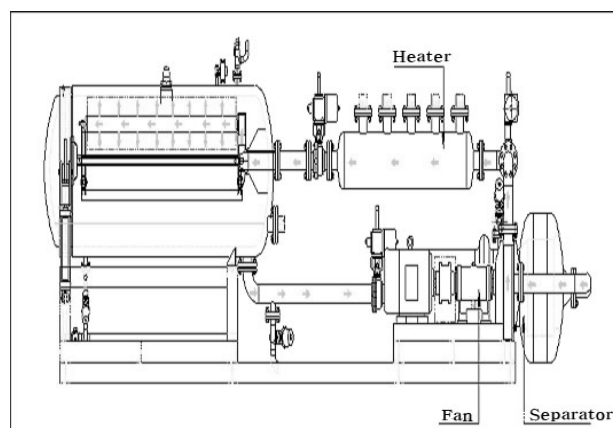


Fig. 2. Hot air flow in drying process.



Photo. 1. Moisture/air separator.

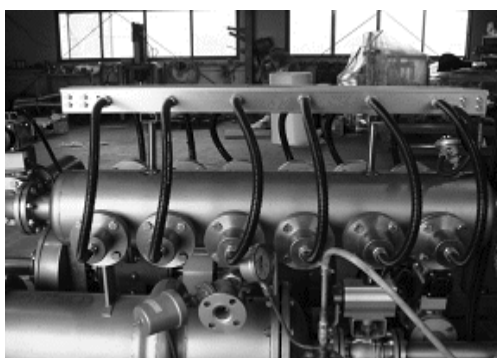


Photo. 2. Heater.

### 3. CONCLUSIONS

1. Multi-purpose after treatment M/C has so designed suitably for DTP that washing and drying are available after steaming.



Photo. 3. Multi-purpose after treatment m/c for DTP in this study

2. Grade of fastness (washing and light) is 4-5 in case of digital printed cotton using developed multi purpose after treatment m/c for DTP

#### 2.4. Results of fastness

- Specimen : cotton 40', Plain (30yds)
- Used ink : reactive ink
- Used printer : Konica (Japan) 300x300 dpi
- Temp. of steaming : 102 °C (100%)
- Time and temp. of washing : 50 °C, 20min
- Time and temp. of drying : 50 °C, 30min
- Steamer, washer, dryer : developed multi purpose after treatment M/C in this study

Table 1. Results of fastness

Time (min.)	Color	washing fastness						Light fastness
		Acetate	Cotton	Nylon	PET	Acrylic	Wool	
20	Black	4-5	4-5	4-5	5	5	4-5	4-5
	Magenta	5	4-5	4-5	5	5	4-5	3-4
	Yellow	5	4-5	5	5	5	4-5	4-5
40	Black	5	4-5	4-5	5	5	4-5	4-5
	Magenta	5	4-5	4-5	5	5	4-5	3-4
	Yellow	5	5	5	5	5	4-5	4-5
60	Black	5	5	5	5	5	5	4-5
	Magenta	5	4-5	5	5	5	5	4
	Yellow	5	5	5	5	5	5	4-5