

CUET · HOME SCIENCE · CLASS XII · CODE 315

# Care and Maintenance of Fabrics in Institutions

CUET unit: Fabric and Apparel — Care and Maintenance of  
Fabrics in Institutions (Unit IV)  
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## Snapshot

- Establishes the two aspects of fabric care: preventing physical damage and refreshing/retaining the appearance through stain, dirt and texture management.
- Introduces laundry as both a science (scientific principles, techniques) and an art (aesthetic skill).
- Classifies the three categories of laundry equipment — Washing, Drying and Ironing/Pressing — and the household, commercial and institutional levels at which they operate.
- Details working of washing machines (top-loading, front-loading, two-tub; fully automatic, semi-automatic, manual) and the operations of an automatic washer (filling, water level, temperature, washing, rinsing, water extraction).
- Compares laundry processes in hospitals (hygiene, disinfection, cotton-dominated linen) versus hotels (aesthetics, perfect finishing) and outlines career and entrepreneurial scope in laundry management.

## Detailed Notes

### 2.1 Core concepts

- Care and maintenance of fabrics has two aspects: keeping the material free of physical damage and rectifying any damage that occurred during use, and retaining/refreshing the appearance by removing stains and dirt while preserving textural and visual characteristics (NCERT Introduction, pp. 190–191).
- Laundry is both a science and an art — a science because it applies scientific principles and techniques, and an art because it requires mastery of certain skills to produce aesthetically pleasing results (NCERT §Basic Concepts, p. 191).
- Care requirements depend on fibre content, type of yarn, fabric construction techniques, finishes applied, and the purpose for which the fabric is used (NCERT §Basic Concepts, p. 191).
- Three categories of equipment are in common use: Washing Equipment, Drying Equipment and Ironing/Pressing Equipment (NCERT §Basic Concepts, p. 191).
- Washing machines come in three structural types — top loading, front loading, and two-tub — and three operational modes: fully automatic (single setting, no operator intervention), semi-automatic (frequent operator intervention; generally two-tub;

- rinse water must be filled/drained each cycle) and manually operated (50% or more of work done manually) (NCERT §A, pp. 191–192).
- An automatic washer performs filling up water, water level control, regulation of water temperature, washing, rinsing and water extraction; the principle of all washing machines is to keep fabric in movement in the washing solution to carry away dirt (NCERT §A, p. 192).
  - Three washing methods: Agitation (top loading; agitator blades rotate or oscillate creating a current), Pulsation (top loading; rapid vertical movements of a pulsator), and Tumbling (front loading; horizontal cylinder revolves, clothes carried up and dropped — clothes move through water rather than water through clothes) (NCERT §A, pp. 192–193).
  - Agitators may be made of plastic, metal (aluminium) or bakelite — materials unaffected by detergents, bleaches and softeners; agitation speed varies with fabric type (NCERT §A, p. 193).
  - Rinsing is critical — inadequate rinsing leaves clothes grey, dull and harsh in texture (NCERT §A, p. 193).
  - Water extraction methods: Spinning (>300 rpm, centrifugal force; optimum 600–620 rpm; range 333–1100 rpm; near-dryness avoided as it causes wrinkles), Bottom-drain (perforated tubs drain at end of wash/rinse, then spin), and Combination Bottom-drain and Spin (best extraction — removes heavy bottom dirt and suspended dirt) (NCERT §A, pp. 193–194).
  - Driers use two circulation systems: (a) low-temperature air circulated at high velocity (room temperature/humidity stays normal), and (b) high-temperature air circulated slowly with a fan drawing air through perforations (relative humidity of exhaust air is high) (NCERT §B, p. 194).
  - Ironing smoothens wrinkles; pressing puts creases (sleeves, trouser legs, pleated skirts). Electric irons have a thermostat for fabric-suited temperature; weight ranges 1.5–3.5 kg. Charcoal irons (metal box with lid + live coals) are still seen in India (NCERT §C, p. 194).
  - Professional washers called dhobis serve households and small institutions; they work at specially marked places called dhobighats (NCERT, p. 195).
  - Commercial laundries are organised in sections (washing, water extraction, drying, pressing, ironing) and may have separate sections for hospital/institutional vs personal work, fibre-specific articles (woolens, silks, synthetics), special articles (blankets, carpets), dyeing and finishes like zari polishing (NCERT, p. 195).
  - Commercial washing machines handle 100 kg or more per cycle (vs 5–10 kg domestic); equipment includes hydro extractors, driers, flat-bed and roller ironing, calendaring machines, folding/packing tables and trolleys (NCERT, pp. 195–196).
  - Hospitals and hotels are the two types of institutions with in-house laundry/maintenance setups (NCERT §Institutions, p. 196).

- Hospital laundry focusses on hygiene, cleanliness and disinfection; most articles are cotton dyed in department-specific colours with excellent wash-fastness; only blankets are woolen; stubborn stains, starching, whitening and perfect finishing are not emphasised; infected articles may be disposed by burning (NCERT §Institutions, p. 196).
- Hotel/hospitality laundry emphasises aesthetics — starching, ironing/pressing, correct perfect folding; fibre contents vary; guest personal laundry is also handled (NCERT §Institutions, p. 196).
- Process of hospital laundry has 10 steps: collection (Emergency, OT, OPD, wards) → transportation (linen bank or hospital to plant) → unloading & sorting (bed linen — clean/mildly soiled/very soiled, patients' dress, doctors' dress, blankets) → washing (100 kg/load machines) → hydro-extraction (centrifugal; removes 60–70% moisture) → drying → pressing/ironing/folding/stacking → mending & segregation of condemned articles → packing → distribution (NCERT, p. 197).
- Large hospitals may have 1,800–2,000 beds; minimum stock requirement is six sets per bed (each set = bed sheet, draw sheet, pillow slip); OT/Maternity/Labour rooms need 5+ changes/day; blankets are not changed daily unless soiled (NCERT, p. 197).
- Careers require knowledge of material (fibre, yarn, fabric, colour, finishes), processes, chemicals/reagents and machinery; Laundry Management short courses offer stipend training and placements in hi-tech laundries of airways, ships, railways, hotels, hospitals; specialisation in Textile Science/Chemistry/Fabric and Apparel within Home Science degrees is useful (NCERT §Preparing for a Career, pp. 198–199).
- Scope includes entrepreneurial ventures serving working women, nursing homes, day care centres; jobs in hi-tech laundries of railways, airways, shipping lines, hotels and hospitals (NCERT §Scope, p. 199).

This is the institutional/industrial laundry chapter of Class XII Unit IV, building on the household-level care chapter (kehe204) from Class XI. Where the Class XI chapter focused on stain chemistry and household laundering, this one treats laundry as a managed operation in hospitals, hotels, hostels, railways, airlines, shipping and large catering establishments.

The conceptual move is from 'I wash my own clothes' to 'an institution must wash thousands of pieces a day, with quality, hygiene and turnaround under control'. This is the realm of Indian hi-tech commercial laundries — IndianRail's mechanised linen plants in major terminals (Mumbai, Delhi, Chennai, Howrah), Air India's in-house and outsourced laundry contracts, the Indian Naval shipboard laundries, the dhobighats of Dhobi Talao (Mumbai), Yamuna Pushta (Delhi), and the contemporary brand-managed institutional laundry chains (UCL, Tata Catpro, Wassup, Tide Up).

Three laundry-equipment categories: Washing (machines + soaps/detergents/bleaches/softeners), Drying (air-circulation driers + line drying), and Ironing/Pressing (electric iron + steam iron + flat-bed press + roller press + calendering machines + folding tables).

Each operates at three scales — household, commercial, institutional — with capacity differences ranging from 5-10 kg (domestic top-load) to 100+ kg (commercial industrial-tunnel washers).

Washing machine taxonomy: by structural design (top-loading, front-loading, two-tub), by automation (manual, semi-automatic, fully automatic), and by washing principle (agitation, pulsation, tumbling). Top-load + agitation/pulsation is the dominant household format in India; front-load + tumbling has grown rapidly in urban middle-class homes since the 2000s for its lower water consumption and gentler fabric handling. Two-tub semi-automatic machines (with separate wash and spin tubs) remain a price-conscious mid-market favourite.

Washing-machine operations: filling water, water-level control (per load), temperature regulation (cold/warm/hot per fabric type), washing (agitation/pulsation/tumbling), rinsing (multiple cycles — inadequate rinsing produces grey-dull-harsh clothes), and water extraction (spinning, bottom-drain, combination). The cardinal principle is that fabric must move in the washing solution so dirt is mechanically carried away.

Water extraction: spinning (centrifugal, 333-1100 rpm, optimum 600-620 rpm — near-dryness avoided to prevent permanent wrinkles), bottom-drain (perforated tub drains by gravity), combination (best — removes both heavy bottom dirt and suspended dirt). Hydro-extractors in commercial laundries are large centrifugal drums that remove 60-70% moisture in seconds, reducing subsequent drying time and energy cost.

Drying: low-temp high-velocity air (preserves room ambient, good for delicates) vs high-temp slow air (rapid drying, suitable for sturdy cottons). Tumble driers in commercial use are typically gas-fired or steam-heated for efficiency.

Ironing vs Pressing: ironing smoothens wrinkles (sliding motion); pressing creates creases (lift-and-place — sleeves, trouser legs, pleated skirts). Electric irons have thermostats with fabric-suited settings (cotton/linen 210°C → wool/polyester 160°C → silk/acrylic/nylon 120°C); steam irons add moisture for stubborn wrinkles; charcoal irons (live coals in a metal box with a lid) persist in rural India and informal urban presswallahs.

The Indian commercial-laundry ecosystem layers traditional dhobi networks (specially designated dhobighats with stone slabs and water access), modern commercial laundries (organised by section — washing, water extraction, drying, pressing, ironing — with specialised lines for hospital vs personal vs fibre-specific articles), and institutional in-house plants (hospitals, hotels, hostels). Commercial laundries handle 100+ kg per machine per cycle, run multi-shift operations, and use hydro-extractors, flat-bed irons, roller irons, calendaring machines and folding/packing trolleys.

Hospital vs hotel laundry contrast: Hospital laundry emphasises hygiene, disinfection and infection control — most articles are cotton with department-specific dyed colours (white sheets for general wards, green for OT, blue for paediatrics, etc.) with excellent wash-fastness; only blankets are woolen; stubborn stains, starching, whitening and perfect finishing are de-emphasised; heavily infected articles may be incinerated rather

than reused. Minimum stock is six sets per bed; large hospitals (1,800-2,000 beds) require correspondingly large linen inventories. Hotel laundry emphasises aesthetics — starching, perfect ironing/pressing, correct folding, monogramming; serves both in-house linen (sheets, towels, table linen) and guest personal laundry (often the highest-margin laundry segment).

The 10-step hospital laundry process: Collection (Emergency, OT, OPD, wards) → Transportation (to in-house plant or to linen bank) → Unloading & sorting (by article type and soiling level) → Washing (in 100 kg/load machines) → Hydro-extraction → Drying → Pressing/ironing/folding/stacking → Mending & segregation of condemned articles → Packing → Distribution.

Career skills: knowledge of fibres, yarns, fabrics, colours, finishes, chemicals, machinery; understanding of GMP for laundries; appreciation of cost economics and capacity planning. Training: B.Sc. Home Science with Textile Science/Chemistry/Fabric and Apparel specialisation; short Laundry Management courses (often with stipend + placement). Scope: hi-tech laundries of Indian Railways, Air India / private airways, shipping lines, hotel chains (Taj, Oberoi, ITC, Marriott), hospital chains (Apollo, Fortis, Manipal, AllMS), and entrepreneurial laundromat / laundry-as-a-service businesses (UClean, Tumble Dry, Pick My Laundry).

## 2.2 Definitions to memorise

Term	Definition	Page
Laundry	The science-cum-art of producing clean, fresh, hygienic clothes and spotless crisp household linen by applying scientific principles and aesthetic skill	191
Fully automatic washer	A washing machine with a single time setting of controls (water filling, temperature, wash cycle, rinses) needing no further operator intervention	192
Semi-automatic washer	A machine requiring frequent operator intervention, generally two-tub, with rinse water filled and drained each cycle	192
Agitation	Washing method in top loading machines where blades rotate/oscillate creating a current that forces water into the fabric	192–193
Pulsation	Top-loading wash method using a vertical pulsator with rapid vertical movements	193
Tumbling	Front-loading wash method where a horizontal perforated cylinder revolves, dropping clothes through the water	193
Hydro-extractor	Equipment working on centrifugal motion that removes 60–70% moisture from washed clothes	197
Calendaring machine	Commercial laundry equipment used for flat ironing/finishing of linen	195–196
Dhobighat		195

Term	Definition	Page
	A specially marked place in towns and cities where dhobis carry out washing	
Ironing	Process of smoothening out wrinkles created with use or during washing	194
Pressing	Process of putting creases such as in sleeves, trouser legs and pleated skirts	194

### 2.3 Diagrams / processes to remember

- Three washing machine models pictured: Top Loading, Front Loading, Two-Tub (p. 192).
- Box: 10-step process of laundry functioning in hospitals — collection, transportation, unloading & sorting, washing, hydro-extraction, drying, pressing/ironing/folding/stacking, mending & segregation, packing, distribution (p. 197).
- Hospital receipt format for washable linen (Bed Sheet, Draw Sheet White/Green, Patient's Kurta/Pajama, Doctor's Kurta/Pajama/Gown, Towel Split/Hand, Face Mask, Baby Frocks, Blanket Big/Baby, Pillow Cover, Slings, Apron, Dirty Linen Bag) (p. 198).
- Photo: Commercial laundry workers sorting linen (p. 199).

### 2.5 Key data / laundry-equipment table (Indian context)

Item	Value / fact	Source
Two aspects of fabric care	Damage prevention; Appearance retention	NCERT pp. 190–191
Three categories of laundry equipment	Washing; Drying; Ironing/Pressing	NCERT p. 191
Washing machine types (structural)	Top-loading; Front-loading; Two-tub	NCERT p. 191
Washing machine types (automation)	Manual; Semi-auto; Fully auto	NCERT p. 192
Three washing methods	Agitation; Pulsation; Tumbling	NCERT pp. 192–193
Tumbling found in	Front-loading machines	NCERT p. 193
Spinning speed range	333–1100 rpm	NCERT p. 194
Optimum spin speed	600–620 rpm	NCERT p. 194
Best water extraction system	Combination Bottom-drain + Spin	NCERT p. 193

Item	Value / fact	Source
Hydro-extractor moisture removal	60–70%	NCERT p. 197
Commercial machine capacity	≥ 100 kg/cycle	NCERT p. 195
Domestic machine capacity	5–10 kg/cycle	NCERT p. 195
Electric iron weight range	1.5–3.5 kg	NCERT p. 194
Hospital laundry emphasis	Hygiene + Disinfection	NCERT p. 196
Hotel laundry emphasis	Aesthetics + Perfect finishing	NCERT p. 196
Minimum linen sets per hospital bed	Six	NCERT p. 197
One linen set	Bed sheet + Draw sheet + Pillow slip	NCERT p. 197
10 steps of hospital laundry	Collection → Transport → Sort → Wash → Hydro-extract → Dry → Press/Iron/Fold → Mend → Pack → Distribute	NCERT p. 197
Indian dhobighat examples	Dhobi Talao (Mumbai); Yamuna Pushta (Delhi)	India context
Indian commercial-laundry brand examples	UClean; Tumble Dry	India context
Indian institutional examples	Indian Railways; Air India; Taj/Oberoi hotels; AIIMS/Apollo hospitals	India context

## 2.4 Common confusions / NTA trap points

- Agitation vs Pulsation vs Tumbling — students mix up which is top-loading vs front-loading. Remember: only Tumbling = front loading; both Agitation and Pulsation = top loading.
- Optimum spinning speed is 600–620 rpm, not 1100 rpm (which is the upper limit of the range 333–1100).
- Hydro-extractors remove 60–70% moisture (not 100%) — they work on centrifugal motion.
- Hospital laundry emphasises hygiene/disinfection; hotel laundry emphasises aesthetics/finishing — do not swap these.
- Minimum linen stock per hospital bed is six sets (bed sheet + draw sheet + pillow slip = one set).

- Commercial machines handle 100 kg or more per cycle; domestic handle 5–10 kg.
- Combination Bottom-drain and Spin gives the best water extraction (not pure spinning).
- Only blankets in hospitals are woolen; all other items are cotton with wash-fast dyes.
- Ironing **smooths wrinkles**; Pressing **creates creases** — don't conflate.
- Spinning near-dryness causes **permanent wrinkles** — that's why optimum is 600-620 rpm, not max 1100.
- Hospital laundry **does not emphasise** stubborn-stain removal or perfect finishing — those are hotel-laundry tasks.

## Practice MCQs

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## PYQ Alignment

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This chapter is a high-yield area for the CUET Home Science Fabric and Apparel unit. NTA typically asks 8–10 MCQs per year covering definitions (laundry as science/art), washing-machine classifications, washing methods (agitation/pulsation/tumbling), spin speeds, hospital vs hotel laundry differences, hydro-extraction percentages, the 10-step hospital laundry sequence, and linen stocking norms (six sets per bed) — usually as direct factual recall, match-the-following and statement-based questions.