LAUNDRY & STAIN REMOVAL

Chapter Outline

A. Commercial and On-site Laundry
B. Flow process of industrial laundering- OPL
C. Stages in the wash cycle
D. Laundry equipment and machines
E. Layout of the laundry
F. Laundry agents
G. Dry cleaning
H. Guest laundry/ valet service
I. Stain removal

Objectives:

At the end of this topic you will be able to:

- Differentiate the different types of laundry and recommend the most suitable laundry for a particular hotel.
- List the different types of laundering equipment and explain their functions.
- List the chemicals used in a laundry and elucidate their composition and functions.
- Illustrate the workflow in a laundry.
- Explain each step in the laundering process and emphasize the importance of each stage.
- Discuss the four factors which affect laundering.
- Interpret fabric care symbols.
- Draw the staff organization chart of the Laundry.
- List the jobs of each position.
- Design a laundry plan and discuss its salient features.
- Suggest the type of equipment required and their capacities.
- Deduce the causes for various common laundering problems and recommend remedies.
- Explain dry cleaning.
Discuss Guest Laundry.
Classify stains and stain removers with examples.
Explain the different ways of removing stains.
Enumerate the means by which a stain could be identified.
Explain the procedure to be followed to remove an unidentifiable stain.
List the different factors to be considered while removing stains.
Suggest stain removers and methods to follow for any given stain.

**LAUNDRY & STAIN REMOVAL**

A hotel laundry is responsible for laundering hotel linen, staff uniforms and guests’ personal clothes. Everyday, thousands of linen have to be washed or dry-cleaned, dried and ironed within a matter of few hours. Operating a laundry involves operating costs like labour, energy, chemicals and water. Wrong laundering procedures and indiscriminate use of chemicals can lead to a poor finish or can cause damage to the fabric. Hence a person in charge of the laundry needs to have the technical know how in operating and maintaining a laundry, efficiently. This topic gives an insight into setting up and running a hotel laundry.

### 4.1 Types of laundry

A hotel may operate its laundry services through –

**(a) Commercial laundries** : These laundries cater to hotels on a contract basis. The contract specifies the rate for laundering different pieces of linen; the time taken for laundering etc. (Usually the soiled linen are laundered and delivered back within 24 – 48 hours.) They are allowed to keep back 3 – 5% of the soiled linen for stain removal etc. This is a good option if the hotel does not want to make heavy investment in setting up their own laundry and has space constraints.
(b) **OPL** – On Premises Laundry: The hotel has its own laundry, which may be run by the management or managed on a contract. Setting up a laundry involves high capital expenditures. The type of equipment to be used, their capacities and how well a laundry needs to be designed is of par. Many hotels are ready to make this heavy investment to provide quality service to the guests. More care is taken while laundering, since it is under the direct responsibility of the hotel. Services are faster (maximum 8 hours), hence parstocks are reduced. Better supervision and better control and hence longer life for linen. There are lesser chances of pilferage, since the linen does not leave the premises. However, contingency plans must be made in case of equipment failure. One must be able to fall back on a commercial laundry or another hotel laundry.

(c) **Laundromats**: These are self service laundries, found in motels.

### 4.2 Work Flow In A Laundry:

1. Collecting soiled linen
2. Transporting soiled linen to laundry
3. Sorting
4. Weighing
5. Spotting (Optional)
6. Washing
7. Extracting
8. Drying
9. Finishing (Ironing)
10. Folding
11. Stacking
12. Transporting fresh linen to linen room.

**Collecting Soiled Linens**: Room attendants cleaning guestrooms should strip linens from beds and bath areas and put them directly into the soiled linen bags attached to the housekeeping cart. Stewards should shake napkins and
tablecloths over a waste receptacle to remove crumbs and food as soon as possible after the table is cleared. These are then later sent to the linen room. In the linen room, the soiled linen are sorted, counted and recorded before they are sent to the Laundry. Soiled linen should be sent within 24 hours to avoid stains from setting in and prevent the formation of mildew. The collection time is usually fixed so that it does not hamper the normal functioning of the linen room. Linens can then be placed in soiled linen hampers or trolleys for delivery to the laundry.

**Transporting Soiled Linens to the Laundry:** Linens are either hand-carried or carted to the OPL. Employees who are hand-carrying linens should be careful not to allow items to drag on the floor, further soiling them. Dragging linens can also create safety hazards for staff who could trip over trailing items. Linen carts should be free of protrusions that could snag or tear items. Carts should move easily, and staff should be able to load and unload linens without undue bending and stretching.

**Sorting:** The OPL should contain a sorting area large enough to store a day’s worth of laundry without slowing down other activities in the OPL. Soiled linens should be sorted

- by the degree of soiling
- by the type of fabric
- by the colour of fabric.

This type of sorting help prevent unnecessary wear and damage to linens. Cleaning rags should always be separated and washed by themselves, never with linen that guests will use.

Sorting by Degree of Soiling: When sorting by degree of soiling, laundry workers divide linens into three categories: lightly, moderately, and heavily soiled. Heavily soiled items require heavy duty wash formulas and longer wash time. Moderately or lightly soiled linens are washed with gentler formulas and in fewer cycles. (Sheets are usually classified as lightly soiled, while pillow cases are considered moderately soiled.)
Without sorting by soil, all linens would have to be washed in heavy-duty formula. Lightly soiled items would be over-processed, leading to unnecessary wear. Sorting by soil also saves repeat washing of items to remove stubborn soils and stains.

Sorting, of course, can lead to partial loads of laundry. Doing too many partial loads wastes energy and water. However, if heavily soiled fabrics are not washed promptly, stains could set and ruin the item. Some OPLs solve this problem by providing several different sizes of washers so that smaller loads can be washed promptly without wasting water and energy.

**Sorting by Linen Type and colour:** Different fibers, weaves, and colors require different cleaning formulas and washing methods. Sorting linens by type ensures that the right temperature and formulas are used on similar fabrics. Wool and loosely woven fabrics, for example, require a mild formula and gentle agitation. Colors should not be washed with chlorine bleach. New colored linens should be washed separately the first few times to avoid dyeing other fabrics. Some special items such as aprons should be washed in nylon bags to prevent tangling.

**Washing:** After linens are sorted, laundry workers collect batches of laundry and deliver them to the washers. Linens should be weighed before they are put into the washer to ensure that washers are not overloaded. Weighing is also important for measuring OPL output. Laundry workers at some hotels pre-treat soiled linens before washing them. However, pre-treating laundry takes a great deal of time and can increase labor costs dramatically. As a result, most OPLs rely on the chemicals used in the washer to clean linens.

**4.3 Wash Cycles:** The typical wash process consists of as many as nine steps:

1. **Flush/ Prewash (1 to 3 minutes)** – Flushes and loosens water-soluble soils using water alone or water with little detergent. This stage prepares the clothes for the next stage.

2. **Break (5 to 8 minutes, optional)** – A high alkaline break (soil loosening) product is added, which may be followed by additional flushes. The break cycle is usually at medium temperature and low water level.
3. **Suds/ Mainwash (5 to 8 minutes)** – This is the actual wash cycle to which detergent is added. Items are agitated in hot water at low water levels.

4. **Bleach (5 to 8 minutes, optional)** – Bleach is added to kill bacteria, whiten

5. **Rinse (3- 5 minutes)** – Two or more rinses at medium temperatures and high water levels are used to remove detergent and soil from the linens.

6. **Sour/softener or starch/sizing (3 to 5 minutes)** – Softeners and sours are added to condition fabric. The cycle runs at medium temperature and at low water levels. Starches are added to stiffen cotton fabrics; sizing is added for polyester blends. Starching/sizing replaces the sour/softener step.

7. **Extract (1 to 5 minutes)** – A high-speed spin removes most of the moisture from the linens. The length of the spin depends on fabric type, extractor capacity, and extractor speed.

Soaking of very soiled clothes are done. This is optional.

**Extracting:** Extracting removes excess moisture from laundered items through a high-speed spin. This step is important because it reduces the weight of the laundry and makes it easier for workers to lift the laundry and move it to dryers. Extracting also reduces drying time. Most washing machines now have extracting capabilities.

**Drying:** Items that are dried generally include towels, washcloths, and some no-iron items. Drying times and temperatures vary considerably for different types of linens. In every case, however, drying should be followed by a cool-down tumbling period to prevent the hot linens from being damaged or wrinkled by rapid cooling and handling. After drying, linens should be removed immediately for folding. If folding is delayed, wrinkles will set in.

Dryers should never be pre-warmed or run when empty. This can lead to “hot spots” which can damage fabric or cause fires. It also wastes energy.

**Ironing:** Sheets, pillowcases, table cloths, and slightly damp napkins go directly to flatwork irons. Ironers vary in size and degree of automation. Uniforms are
generally pressed in special ironing equipment. Steam tunnels are being used more often for removing wrinkles from polyester blend uniforms.

**Storing :** After folding, the items are post-sorted and stacked. Post-sorting separates any linen types and sizes that were missed in pre-sorting. There should be enough storage room for at least one pair. Finished items should be allowed to “rest” on shelves for 24 hours after laundering because many types of linens are more easily damaged right after washing. Once linens are on shelves, yellowing and fading can be spotted quickly.

**Transferring Linens to Use Areas :** Linens are usually transferred to their use areas via carts. Fresh linen carts should never be used for soil linen pick up as this may lead to cross contamination. This is especially important in hospitals. It is a good idea to colour code fresh and soil linen carts.

**4.4 Equipment Used In The Laundry**

OPL machinery is a major investment in itself and affects the life span of other major investment-linens. The choice of OPL machines and equipment could mean the difference between a financially successful and a disastrous OPL. Machines with insufficient capacity, for example, result in damaged linens, unsatisfactory cleaning performance, excessive energy and water costs, or increased maintenance costs. Improperly maintained equipment can also lead to higher linen and equipment costs. List of machines and equipment used in the laundry are:

1. Washing Machine

2. Hydro Extractor } or Wash Extractor

3. Tumbler or Drier

4. Finishing Machine - Calendering Machine or Rotary Ironer
   - Steam press
   - Flat Iron
   - Suzies/ Genies

5. Folding Machine
6. Weighing scale
7. Dry cleaning machine
8. Trolleys
9. Cupboards, Shelves, Racks, Tables
10. Sewing Machine
11. Steam cabinets and Tunnels
12. Boilers

**Washing Machines**

Most washers are made of stainless steel. They are sized by their capacity (that is, the number of pounds of linen they can handle in a single load). Sizes vary from 10 to 500 kg capacities.

Washers consist of a motor, inside and outside shells, and a casing. The outside shell is stationary and holds the wash water. The inside shell holds the laundry and is perforated to allow water for various cycles to flow in and out.

The washer’s motor rotates either the perforated inner shell or an agitator. The rotating shell or agitator helps the detergent break up soils on fabrics in the wash cycle and remove detergents and other chemicals during the rinse cycles.

Most newer washers have automatic detergent and solution dispensing capabilities. Equipment should have at least five ports (openings through which detergents can be poured) – two for detergents and one each for bleach, sour, and softener. Chemicals that are simply dumped onto the linens can severely damage them.

Most washers have extraction capabilities. The motor spins the inside shell rapidly to remove most excess water after washing is completed. If the washer cannot remove this water, a separate extractor must be used. Extractors are available in centrifugal, hydraulic, and pressure types. Microprocessors are computer controlled washing machines. After the linen are loaded in, the relevant
code is punched in. Based on the code, the computer decides the type of programme, the temperature and the chemicals to be utilized for that wash.

**Hydro Extractor:**

As the name suggests, it extracts water out of the washed linen by means of centrifugal force or by the application of pressure. After extraction, linen are in a damp condition. Hydro extractors and washers are also available as a single unit.

**Drying Machines: Tumbler or Dryer/ Tumbler Drier:**

The damp linen coming out of the hydro extractor are tightly packed. They are put into tumblers or dryers to loosen them out and also to dry them further. Gas, electricity, or steam heats air. The air flow must be unrestricted to ensure the dryer's energy efficiency.

**Steam Cabinets and Tunnels**

Steam cabinets or tunnels effectively eliminate wrinkles from heavy linens such as blankets, bedspreads, and curtains. A steam cabinet is simply a box in which articles are hung and steamed to remove wrinkles. A steam tunnel actually moves articles on hangers through a tunnel, steaming them and removing the wrinkles as they move through.

**Calendering Machine/Ironing Machine/Rotary Ironer:**

This very large machine consists of several heated and well padded rollers which irons the articles as it passes through. All flat pieces (eg: bedsheets, table cloth, pillow slips) are passed through this machine. After ironing, the articles are folded automatically by an electric device (folding machine) or by hand.
Steam press:

Uses heat and steam to press clothes. The neatly folded clothes (e.g. shirt, trousers etc.) are sandwiched between two plates, the ‘head’ which gets hot and the ‘buck’, through which the steam is passed. Steam presses have additional attachments like the cuff and collar press.

Suzies/Genies:

They are made of inflatable material and are in the shape of a human torso. The skirt/pant/coat to be ironed is draped on the suzie. When put on, it is pumped up with hot air and inflated. The heat and the stretching action, irons the clothes out.

Flat iron/Hand iron

Trolleys/Rolling/Holding Equipment

Rolling and holding equipment is used for linen handling. Carts are used in most laundries to move linens and to hold them after they have been sorted for washing, drying, and finishing. Carts must be kept orderly so that staff can move freely through the OPL. They must also be carefully marked so that carts for clean linens are not mixed up with those used for soiled items.

Dry cleaning machine:

Operates like the washing machine; but instead of using water, it uses dry cleaning fluid like perchlorethylene. Clothes are washed and rinsed in this solution, the solvent is filtered and re-used automatically in the machine.

Tunnel washers:

Used in very large laundries where tons of linen are washed. These washers are like a tunnel with different compartments for pre-washing, main washing, rinsing and extracting. As soon as the first cycle is finished on the first load of laundry,
the wash moves into the second chamber. The laundry attendant can then load
the first chamber with the next batch.

Sewing Machine – for repair jobs

Cupboards/Shelves/Racks/Tables

Weighing Scales: To weigh linen before loading the machines

4.5 Planning an OPL

A decision on whether to include a laundry ideally should be made in the initial
planning stage of a facility. If this is not done, considerable cost may be
necessary to change plumbing and electrical systems. Very hot water, cold water,
steam, gas and large sewer drains and water lines are essential plumbing
considerations. Hot water should be available between 160 and 180 degrees for
proper sanitation in the machines. Both 115 and 220 grounded electric outlets
should be provided in strategic locations for the laundry equipment.

Location
The location of the laundry is strategic because of transportation problems and
the noisy and humid nature of the area. The laundry should, if at all possible, be
easily accessible from the linen room so that heavy bundles of laundry can easily
be transported from one location to another. It should be located away from
guest areas because of the noise, vibration and humidity problems unique to a
laundry. It should preferably be on the outside of the building to provide
adequate venting. The laundry should be located so that it can be operated
and/or used by both men and women.

To minimize installation cost and disruption, check out utilities and drains
available in this location.
**Size:**

It is difficult to state an optimum size for laundry because of the many variables that have to be considered for individual needs. Rule of thumb for hotels is 7 sq ft./room (not including soil storage). For soil storage: 1 cu.ft. for every 8 lbs. (upto a height of 4 ft.)

**Equipment selection**

Laundry equipment must be considered in relation to initial cost, life expectancy, maintenance and depreciation. Local costs of utilities such as electricity, water and gas need to be considered.

Generally it's wise to install two small washers rather than one big one. This is because:

- it will take less time to accumulate a full load for a smaller machine;
- you'll have a backup if one machine needs service;
- you'll be able to handle small, odd lots more efficiently;
- you'll be able to wash two different types of goods (e.g. heavily soiled uniforms and lightly soiled sheets) concurrently;
- small machines impose less of a shock load on hot water and electrical systems.

Exceptions which call for a single large machine rather than two small models:

- when the choice is between one 35-lb, commercial machine or several home appliance washers (here, choose the commercial machine because of professional washing quality, durability, and efficiency);
- when space won't permit two machines;
- when the capital budget won’t permit two machines (generally, one large model costs less than two small models).

Where a choice is available, consider buying one washer-extractor with high speed extraction and one with low speed extraction. The former can be used for
towels as well as permanent press sheets, and the latter can be dedicated to permanent press sheets (which need less extraction speed). This will reduce the total price.

An extractor is a machine that forces most of the moisture out of the laundry by applying centrifugal force. After extraction, the wet laundry weighs about 1 1/2 times the weight of dry laundry. Combination washer-extractors cost less than two separate machines, require less space and eliminate one step in the laundry process (i.e., removing the wet laundry from the washer and putting it into an extractor). A washer-extractor with a 25 lb. capacity will take approximately 25 minutes to complete a cycle.

Regardless of whether a separate washer and extractor are selected, a dryer is needed. Commercial dryers are referred to as tumblers. In general, the tumbler should have a capacity of about 25 per cent greater than the extractor. By estimating the laundry requirements by day, week, and year, the capacities and the number of machines required can be calculated.

Wet laundry must be moved from the washer-extractor to the dryer; dry laundry must be moved to storage shelves and to shower areas and equipment issue areas. To facilitate these transfers, utility baskets, hampers and/or trucks must be provided.

A work table, with casters on the legs, is very convenient for folding towels and other laundry. It can readily be moved about the room as needed. There should be cupboards or bins for storage of detergents, soaps, bleaches and other cleaning agents.

**Layout**

The layout of the laundry should be such that there is an easy flow of traffic. In positioning machines, pay close attention to entries, exits, columns, drain locations, exhaust areas, ventilation, and machinery access. Separate the soiled
and clean laundry handling areas as much as possible, to prevent recontamination of clean goods.

Doors need to be large enough to initially get the equipment into the room as well as being large enough to effectively enter and exit with utility carts and/or laundry baskets. Swinging doors are good for cart movement. They should have windows for safety and bumpers or guards to protect their appearance. Thresholds should be flush.

Ceilings should be impervious to moisture and have good sound absorption qualities. An 8 to 10 foot high ceiling is sufficient. Floors are very important in the laundry. They should be level concrete slabs capable of supporting the heavy cleaning machines. The floor around the machines should be sloped and there should not be any low spots in the floor where water can pool. Concrete is the most suitable floor material and can be covered by one of the synthetic resinous materials available with a smooth yet non-slip surface.

The walls should be constructed of a material that is durable, moisture resistant and insulating. Windows should be avoided so that wall space can be used for storage shelves and bins; however if they are required, care should be given as to their placement in order to eliminate glare. Any windows should be constructed with wire glass and be located high on the wall.

Allow at least 18 inches between machines (the same applies to a side wall). Dryers can usually be placed side by side (allow about an inch between them). Provide at least two feet between the back of the machine and the wall. If space is tight, try locating machines in front of a large door to a hall or to the outside. The door can be opened for servicing the machines.

Try to locate dryers next to an outside wall. They must be vented. Soiled storage and sorting should take place near the washers. Dryers should be a minimal distance from the washers, but they should not interfere with loading and unloading (or sorting).
The folding table and area should be located so that finished work is moving toward its final storage area in preparation for distribution.

**Labor**

First check within the organization for employees with regular slack periods, you may use them to help in the laundry.

One rule of thumb for a small institutional laundry is that one person would be able to handle about 80 lbs. an hour.

**Other Costs**

Costs of supplies such as soap, bleach and softening agents should be estimated, and consideration should be given as to how bulk quantities of these supplies will be stored. Decisions have to be made as to who will maintain and supervise the laundry and what work force will be utilized.

After all these factors have been considered, comparisons can be made with commercial laundry charges to check out an OPL’s feasibility.

## Activity 1

**Activity 1 : Draw the layout of a full fledge laundry of a five star hotel of 200 guest rooms. Mark the placements of equipments(as per scale)**

### 4.6 Chemicals Used In Laundering / laundry agents

Hotel and other commercial OPLs use many more chemicals to wash linens than people use in their washers at home. The hotel laundry “fine-tunes” its chemicals to ensure an effective wash that leaves linens looking as close to new as
possible. The following list provides a brief description of the major categories of chemicals used in laundry operations.

**Water**: is the major cleaning agent in laundering. Water must be soft, clean and devoid of minerals to give a good wash. Hard water can prevent lather formation and damage clothes in the long run. White colored clothes turn grey in hard water. Hard water can also clog pipelines. Hence hard water must be softened.

**Detergent:**

Water by itself cannot clean fabrics, due to its surface tension. Hence detergents are used. A good detergent must have the following properties:

- Wetting properties
- Emulsifying
- Suspending

In addition, detergents must be:

- Readily soluble in water
- Effective in all kinds of water and over a wide range of temperatures.
- Harmless on skin and fabrics.
- Able to clean effectively with minimum efforts
- Rinsed away easily
- Biodegradable

Detergents can be in the form of a liquid, powder or cake. Liquid detergent disperses well in water. However, it does not have all the ingredients of a powdered detergent. Liquid detergents are normally used for washing delicate fabrics.

Detergents are also available as:

- **Pure Soaps or Neutral Soaps** are used for delicate garments. They are formed by saponification. They do not act in hard water
- **Synthetic Detergents** act in hard water and they have several chemical additives to act on different types of fabrics and varied range of temperatures.
**Built soap / Builders** are highly alkaline in nature and are used for highly soiled linen. *Detergents with enzyme* have pepsin in them. They help in breaking protein stains. However, the wash temperature must not exceed 50 degrees centigrade as pepsin gets inactivated.

Synthetic detergents are commonly used in laundering. Their basic ingredient is surfactant. Surfactants can be cationic, anionic or non-ionic.

Other Additives are:

1. Alkaline Builders eg: Soda, Borates, Silicates and Complex phosphates
2. Sodium Silicate – Prevents corrosion
3. Sodium Sulphate – Bulking agent . Constitute 20%
5. Sodium Perborate or Sodium Percarbonate – Oxidising bleach. Removes stains 85 – 100 C
6. Tetra Acetyl Ethylene Diamine (TAED) – Bleaching agent. Lower temperature
7. Foam/Lather stabilizers – Ethanolamides
8. Fluoresers
9. Enzymes
10. Germicides, Perfumes, Dyestuff

**Alkalies**: Alkalies or alkaline builders help detergents lather better and keep stains suspended in the wash water after they have been loosened and lifted from the fabric. Alkalies also help neutralize acidic stains (most stains are acidic), making the detergent more effective. E.g. soda, borax.

**Bleaches**: Bleaches cause strong chemical reactions that, if not carefully controlled, can damage fabrics. Used properly, bleaches help remove stains, kill bacteria, and whiten fabrics.

*Caution: Avoid*
- **Oxidising bleaches on rust stains as they get fixed.**
- **Reducing bleaches on wool and silk as they get yellowed.**
- **Chlorine bleach on polyester and polyester blends as they get damaged.**

Antichlors are used to neutralize the chlorine left behind by chlorine bleach. E.g., sodium thiosulphate. Polyester fibers retain chlorine, and for this reason is typically treated with antichlors when chlorine bleach is used.

Fabric (optical) brighteners. Brighteners make white fabrics seem whiter by changing the wavelength of ultra violet rays. These chemicals are often pre-mixed with detergents and soaps.

Mildewcides. Mildewcides prevent the growth of bacteria and fungus on linens for up to 30 days. Both these types of micro organisms can cause permanent stains that ruin linens. Moisture makes a good breeding ground for mildew growth. Therefore, soiled damp linen should be washed promptly and not allowed to sit in carts for long periods. Clean linens should be dried and/or ironed as they are removed from washers or extractors.

**Sours.** Sours are basically mild acids used to neutralize any residual alkalinity in fabrics after washing and rinsing. Detergents and bleaches contain alkali, and any residual alkali can damage fibers and cause yellowing and fading. In addition, residual alkalies can cause skin irritation and leave odors.

**Fabric softeners.** Softeners make fabrics more supple and easier to finish. Softeners are added with sours in the final wash cycle. They can reduce flatwork ironing, speed up extraction, reduce drying time, and reduce static electricity in the fabric. Too much softener can decrease a fabric's absorbency.

**Starches.** Starches give linens a crisp appearance that stands up during the items' use. If they are used, starches should be added in the final step in the washing process.
Four Factors In Laundering:

1. Temperature
2. Mechanical Action
3. Chemical Action
4. Time

1. Temperature: the major reason why we wash in hot water. “For every 10 °C rise in temperature, the rate at which soil is removed is doubled”.

High temperature has other advantages and disadvantages.

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
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<tbody>
<tr>
<td>Melts fats</td>
<td>Fixed protein soils</td>
</tr>
<tr>
<td>Disinfects linen</td>
<td>Costs energy</td>
</tr>
<tr>
<td></td>
<td>Decomposes wool</td>
</tr>
<tr>
<td></td>
<td>Can bleed colour</td>
</tr>
<tr>
<td></td>
<td>If not carefully cooled, causes creasing of polyester</td>
</tr>
</tbody>
</table>

2. Mechanical Action: Physically breaks up soil and detaches soil from linen. Factors affecting mechanical action:
   - Loading – amount of linen in machine.
   - Water levels – amount of water in machine
   - Foam
   - Machine type
   - Type and size of pockets

3. Time:
   Generally the longer the wash the better!

Exceptions:
   The heavier the degree of soiling; the shorter the first wash should be.
   If a main wash of more than 16 minutes is required, it is better to do two eight minute washes.
4.7 Dry Cleaning

This is the cleaning of fabrics in a substantially non-aqueous medium. In dry cleaning, dry powders and liquids such as perchloroethylene, benzene etc are used to remove stains. Unlike laundering, dry cleaning does not cause swelling of the fibers and thus does not lead to shrinkage, wrinkles and bleeding of colours.

Advantages of dry cleaning

- Dry cleaning suits all fabrics
- Causes no shrinkage
- Does not flatten the pile of fabric such as velvet
- Finishes are retained even after dry cleaning
- Colours do not bleed
- Stains are easily removed

Disadvantages

- Expensive
- Dry cleaning solvents are harmful to health if inhaled
- After dry cleaning a certain unpleasant smell is retained

Process of dry cleaning

Marking
Every article is marked individually to facilitate identification

Sorting
Garments are sorted into:
- white and light coloured clothes
- dark coloured clothes
- white and light coloured woolens
- dark coloured woolens
- drapery and furniture covers
- rain clothes
-
Application of absorbents
Absorbents are applied to remove grease spots from all kinds of materials. The common absorbents used are starch, powdered magnesia, French chalk, fuller’s earth, bran etc.

Pre spotting
Pre spotters are applied using a spotting gun, which uses compressed air to help spray the solvent on to the stain or a heavily soiled area. Solvents such as amyl acetate, emulsifying agents and enzymes are used for pre spotting.

Cleaning
Clothes are loaded to the dry cleaning cylinder. Very delicate clothes are placed in a net bag. An appropriate solvent is circulated through the clothes. The contact time of the clothes with the solvent and the rinsed time may vary. Immersion and agitation of the garments in the solvent takes place, loosening the soil and dissolving it.

Extraction
Excess solvent is removed from the garments by centrifugal action in a revolving perforated cylinder.

Drying
After extraction, the garments are dried, temp is controlled and kept around 70 degree centigrade.

Filtering and distillation of the solvents
Solvents are expensive and therefore filtered out distilled and reused.

4.8 Guest Laundry

Managing Guest Laundry is one of the major responsibilities of the Housekeeping Department. Guest laundry must be picked up in time, laundered and delivered back to the guests in time without any mix ups. Usually clothes collected in the morning are given back the same evening. The hotel also caters to Express
Laundry which takes about 2 hours. The guests are usually charged extra. Considering the amount of guest laundry handled in a day, this requires for following proper systems and procedures. Since Guest Laundry consists of different types of fabric, each will have to be dealt with care individually.

Laundry list

Every guest room is provided with laundry bags and laundry lists. The guest is expected to place the soiled clothes in the laundry bag, fill out the laundry form with the necessary details, and place a call to the housekeeping to get the laundry collected.

The valet checks the clothes against the list and take them down to the linen room. Here the clothes are checked for repairs needed, and stray items left in the pockets, they are marked or tagged and details are recorded to avoid misplacement. The clothes are washed, drycleaned or ironed according to the guest’s requests. Before ironing the clothes are re-sorted according to the room number. The ironed clothes are packed and delivered to the guest rooms with the counter foil of the laundry lists. Items found in the pockets are delivered back to the guest along with the laundry.

Valet service
4.9 Stain Removal

‘Stain’ is a spot or mark of discoloration left on fabrics by the contact and absorption of some foreign substance. Some stains can be removed during the normal washing process. But certain stains require special treatment with stain removal agents. The use of these agents requires care as these can cause weakening of fibres, bleeding, and can damage the fabric. So, we must be able to identify stains as far as possible and should also know if certain agents can harm certain types of fabrics.

Stains can be broadly classified as

- **Animal**: Caused by blood, egg, milk, meat juices. As these contain protein matter; heat must be avoided. Otherwise, it may coagulate and get fixed into the article.
- **Vegetable**: Caused by tea, coffee, cocoa, fruit, wine. These are acidic and therefore require alkaline reagents to remove them.
- **Grease**: Caused by butter, curry, oil paint, varnish, tar. Usually grease solvents are used to remove them.
- **Dye**: Can be acidic and alkaline
- **Mineral**: Rust, black ink, iron mould, certain medicine stains
- **Scorch**: Caused by a very hot iron
- **Grass**: Stains come under vegetable group but a different method is used for removing the green coloring matter chlorophyll.

The main stain removal agents are:

(a) **Organic solvents**:
   - i) Inflammable: eg: benzene, white spirit, turpentine, acetone, methylated spirit.
   - ii) Non-inflammable: eg: carbon tetrachloride, perchlorethylene. These solvents usually do not harm fabric. But certain solvents like acetone dissolves rayon acetate. Others affect
rubber. These solvents can remove grease stains and other non-greasy stain like chewing gum, ballpoint ink, cosmetic stains etc.

(b) Acids: eg: oxalic acid, potassium acid oxalate (salt of lemon). Certain fibres and dyes are susceptible to damage by acids. However dilute acids can be used on whites. Acids are used to remove metal stains like iron mould and rust. It is essential to neutralize the acid by rinsing the articles in a weak alkaline solution. Otherwise any remaining acid can cut into the fabric and damage it. However animal fibres (like wool, silk) are susceptible to damage by alkalies.

c) Alkalies: eg: soda, borax. Usually removes vegetable stains like tea, coffee, coco, wine etc. Alkalies can adversely affect dyes and animal fibres.

d) Bleaches: are used to whiten an article. It should be used carefully as this can weaken fibres. Bleaches can be (i) oxidising bleaches (ii) reducing bleaches.

(i) Oxidising bleaches: eg: Sodium hypochlorite, hydrogen peroxide and sodium perborate. Sodium hyp. can damage animal fibres. It can remove difficult stains from cotton and linen but it fixes iron stains. It can be damage certain fabrics containing resins (50/50 polyester/cotton) as the resins tend to retain chlorine. Usually an antichlor eg: sodiumthiosulphate is added to the final rinse to remove all traces of chlorine. Hydrogen peroxide is a slower acting agent and is usually used on whites. Sodium perborate is present in soaps and detergents. It is safe and used on most fabrics.

(ii) Reducing bleaches: eg: sodium hydrosulphite. These remove oxygen or add hydrogen to the fabric. It can be used on most white fabrics and can also be used to
remove rust stains and stripping dyes. However certain white articles bleached by reduction can get yellowed in sunlight. eg: wool, spandex.

(e) Enzymes: eg: powdered pepsin. Used for the removal of protein stains on all fabric. Heat must be avoided as it can coagulate and fix protein stains.

Different Methods Of Removing Stains:

1. Dry cleaning method:
   Remove surface deposit
   Dab stain with a pad saturated in the recommended solvent.
   Blot dry after each application.
   Launder.

2. Absorbent Method:
   Remove surface deposit
   Apply absorbent powder thickly over
   Flatten gently
   Remove when saturated.

3. Sponging and soaking Method
   Non washable fabric
   Remove surface deposit
   Sponge with cold water
   Pour cold water from a height of 2 - 3 feet.
   Washable fabric
   Remove deposit
   Rinse with cold or warm water
   Soak in the recommended cleaning solution
   Sponge with cleaning solution.
   Rinse in water and Blot dry.
4. Sponging and Soaking Method: (Upholstery/Carpet)

   Sponge the stain using shampoo foam

   Blot dry
   
   Rinse with cold water by sponging

   Leave it to dry.

   If stain persists - follow Method 1 or seek professional help

5. Boiling Water Method-

   Stretch fabric over basin

   Sprinkle stain with a little detergent or borax

   Pour boiling water through the stained part from a height of 2 - 3 feet.

   Rinse

6. Bleaching Method

To treat an unknown stain

i) Soak in cold water.

ii) Dry and use a grease solvent.

iii) Use an acid

iv) Use an alkali

It is essential to remove agents completely by neutralising, washing or rinsing the fabric.

Factors to be kept in mind while stain removal:

1. Treat stains as soon as possible.

2. Consider the fabric. Follow manufacturer's instructions.

3. Check the effect of the remover in an unimportant part.

4. Use weakest methods first

5. Use weak removers

6. Work from the outside of the stain to the inside.

7. Acidic or alkaline removers must be neutralised after application.

8. After treating; launder or dry clean.
Removal Of Common Stains

Alcohol
1. Wipe up immediately and sponge with warm water.
2. Use detergent solution and rinse.
3. If necessary, use chlorine/hydrogen peroxide bleach.

Ball point
1. Use methylated spirit or se glycerine with ammonia solution.
2. If necessary, use chlorine bleach solution.

Beer
1. For dried stains, use hydrogen peroxide solution (whites) or white vinegar (colored).

Blood
1. Soak immediately in cold water.
2. Wash in warm enzyme detergent solution or soak in hydrogen peroxide solution.
3. For dried stains use ammonia.

Candle wax
1. Scrape off deposit.
2. Place a blotting paper over and under the stain and pass a warm iron over it. Change the paper and repeat the process until the wax is absorbed.
3. Remove any remnant discoloration with methylated spirit or dry cleaner.

Chewing gum
1. Chill with ice to harden and scrape off.
2. Use dry cleaner.
Chocolate, Cocoa
1. Scrape off deposit.
2. Use enzyme detergent solution or borax solution.
3. If necessary, use dry cleaner.

Coffee
1. Wash off immediately.
2. Use borax solution.
3. For dried stains, use glycerine solution.
4. If necessary use chlorine bleach.

Cosmetics (Lipstick, foundation, blusher)
1. Remove surface deposit.
2. Sponge with glycerine. Rinse.
3. Use dry cleaner.

Curry
1. Remove deposit and use glycerine solution.
2. Use enzyme detergent solution or ammonia solution.
3. If necessary, bleach.

Egg
1. Scrape off deposit.
2. Soak in cold salt water.
3. Use enzyme detergent solution.

Fish slime
1. Soak in salt water and wash as usual.

Fat/Grease
1. Remove surface deposit.
2. Use absorbent powder
3. Or use blotting paper and warm iron.
4. Wash in warm detergent solution or dry cleaner.
Jam/Ketchup
1. Remove surface deposit.
2. Wash with detergent.
3. If necessary, use bleach.

Metal polish
1. Use spirit or dry cleaner.

Mildew
1. Moisten with lime juice and salt.
2. Dry in the sun.
3. If necessary use hydrogen peroxide or chlorine bleach solution.

Mud
1. Remove surface deposit.
2. Use detergent solution.
3. For dried stains, brush and use drycleaner.

Nail varnish
1. Remove surface deposit. Use non-oily nail polish remover or methylated spirit.

Paint, oil based
1. Remove surface deposit
2. Use thinner/ turpentine/ white spirit.

Paint, water based
1. Remove deposit.
2. Wash in cold water.
3. For dried stains, use methylated spirit.

Pencil
1. Use an eraser.
2. If necessary, use a drycleaner.

**Perfume**
1. Sponge with water immediately
2. Use glycerine solution.

**Perspiration**
1. Sponge with warm enzyme detergent solution or use ammonia solution.
2. For old stains use white vinegar solution.
3. If necessary use hydrogen peroxide solution/ chlorine bleach solution or dry cleaner.

**Resin**
1. Use eucalyptus oil or thinner.

**Rust**
1. Use lime juice and salt.
2. Or use oxalic acid.(2%)

**Sand**
1. Brush off excess.
2. Soak in detergent solution.

**Scorch**
1. Soak in borax/ hydrogen peroxide/ ammonia solution. May be impossible to remove from wool, silk.
2. For non washables, rub with glycerine solution. If necessary, sponge with borax solution.

**Shoe polish**
1. Remove surface deposit.
2. Use dry cleaner or spirit.
Smoke/Soot
1. Vacuum deposit.
2. Soak in detergent solution.
3. Use dry cleaner for non-washables.

Tobacco/Grass
1. Use eucalyptus oil/glycerine/methylated spirit
2. If necessary, use dry cleaner or chlorine bleach.

Urine
1. Rinse in cold water and launder as normal.
2. For dried stains soak in enzyme detergent solution.
3. If necessary, use hydrogen peroxide and ammonia solution.

Vomit
1. Remove surface deposit.
2. Rinse in cold running water.
### 3.9 Common Laundry Problems

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Graying</td>
<td>Too little detergent</td>
<td>Increase amount of detergent; add bleach</td>
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<tr>
<td></td>
<td>Wash cycle temperature too low</td>
<td>Increase temperature.</td>
</tr>
<tr>
<td></td>
<td>Poor sorting; transfer of soiling occurs</td>
<td>Rewash with increased detergent at hottest possible temperature. Use suitable bleach.</td>
</tr>
<tr>
<td></td>
<td>Color “bleeding”</td>
<td>Do not dry. Rewash with detergent bleach. Lauder new colored clothes separately, especially the first few times.</td>
</tr>
<tr>
<td></td>
<td>Pure Soap used in hard water</td>
<td>Soften water or use synthetic detergent.</td>
</tr>
<tr>
<td>2. Yellowing</td>
<td>Insufficient detergent</td>
<td>Increase the amount of detergent or bleach.</td>
</tr>
<tr>
<td></td>
<td>Wash temp. too low</td>
<td>Increase temperature.</td>
</tr>
<tr>
<td></td>
<td>Use of chlorine bleach on wool, silk or spandex items</td>
<td>Yelloed items cannot be restored.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Avoid chlorine bleach on such items</td>
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<tr>
<td>3. Rust Stains</td>
<td>Iron/Manganese in water supply pipes or water heater</td>
<td>Rewash with a commercial stain remover. Do not use chlorine bleach. Use water softener. If rust is in pipes, run the water for sometime to clear the line.</td>
</tr>
<tr>
<td>4. Blue Stains</td>
<td>Blue color in detergent, fluorescer or fabric softener softener.</td>
<td>For detergent or fluorescer stains soak items for an hour in a solution of one part white vinegar per four parts of water. For softener stains, rub with bar soap and wash. To prevent stains, use a liquid detergent or fluorescer. Soak in a plastic container in a faded solution of 1 cup white vinegar to one gallon water. To prevent, switch to a liquid detergent.</td>
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<tr>
<td>5. Poor soil removal</td>
<td>Too little detergent</td>
<td>Increase amount.</td>
</tr>
<tr>
<td></td>
<td>Wash temperature too low</td>
<td>Increase temperature.</td>
</tr>
<tr>
<td></td>
<td>Overloading washer</td>
<td>Wash fewer items per load, sort properly; use the proper amount of</td>
</tr>
</tbody>
</table>
| 6. Greasy or oil | Too little detergent  
Wash temperature too low  
Undiluted fabric softener has come in to contact with fabric | Treat with stain remover; increase stains the amount of detergent.  
Wash in higher temperature.  
Rub fabric with bar soap and wash;  
dilute the fabric softener before adding. |
|-----------------|-------------------------------------------------|---------------------------------------------------------------|
| 7. Residue of powder | Undissolved detergent  
(especially noticeable on dark clothes).  
Non-phosphate granular detergent combines with water minerals and forms residue | Add detergent to the washer before putting the clothes in and then start washer. Remove stain by mixing up of one cup of white vinegar to one gallon of warm water.  
To prevent residue, switch to a liquid detergent. |
| 8. Lint | Improper sorting (mixing napped fabrics with others)  
Tissue in aprons or uniform pockets.  
Clogged washer lint filter or dryer  
Over drying causes static electricity which attracts lint. | Prevent problems by sorting more carefully.  
Check pockets before laundering.  
Clean filters and screens after lint screen each use.  
Dry items and pat masking or transparent tape, rewash and use fabric softener in final rinse.  
Rewash items using fabric softener; remove items from dryers when they are slightly damp. |
| 9. Holes, tears, snags | Incorrect use of chlorine bleach  
Unfastened zippers, hooks, buckles  
Burrs in washer  
Washer overload | Always use bleach dispenser and bleach with 4 parts water; never pour directly on linens.  
Fasten them before washing.  
Inspect and repair as necessary.  
Avoid overload. |
| 10. Color fading | Unstable dye  
Wash temperature too hot  
Improper use of bleach  
Undiluted bleach poured | Test fabrics for color fastness before hand. Wash colored items separately  
Use cooler water.  
Use oxygen bleach, if necessary.  
Dilute bleach. |
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Wrinkling</td>
<td>Failure to use correct cycle. Overdrying Washer/dryer overload</td>
<td>Use perm. press cycle; cooler temperature; Remove dried clothes from the drier immediately. Do not overload.</td>
</tr>
<tr>
<td>12. Shrinking</td>
<td>Overdrying Residual shrinking Agitation of wool items</td>
<td>Reduce drying time; remove items while damp and stretch knits back into shape; dry flat. Allow for some shrinking when purchasing items. Lower agitation and reduce extraction speed.</td>
</tr>
<tr>
<td>14. Glazed or fused</td>
<td>Dryer/iron heat too high</td>
<td>Lower heat.</td>
</tr>
<tr>
<td>15. Loss of absorbency</td>
<td>Washing/ drying temperature too high Too much fabric softener</td>
<td>Reduce heat Use less softener.</td>
</tr>
</tbody>
</table>