

Unit-6

Cleaning Science

Objective

- Feature of good cleaning agent.
- Different types of cleaning agent

Main points

- Types of cleaning agent.
- Application of cleaning agent.

CLEANING SCIENCE

- By cleaning we mean removal of dust, dirt, stain and other unwanted substances from the surface.
- Dust settled on surface can be removed by normal dusting but when dust comes in contact with grease, oil or moisture then cleaning agents are required.

CLEANING METHODS

- Washing e.g. water and cleaning agent
- Friction using an abrasive. For e.g. sandpaper
- Static electricity by using a mop sweeper.
- Suction using a vacuum cleaner
- Force using a pressurized water.
- Sweeping before dusting
- Damp dusting(only after dust has settled down)
- Mopping by using hot & clean water and a neat mop.

TYPES OF CLEANING AGENTS

- **1) WATER**: It is the simplest and the most common form of cleaning agent. Its cleansing property is not effective due to high surface tension hence it has to be used in conjunction with a detergent. It's cleansing property is also reduced due to hardness in water.
- **HARD WATER**: Hardness in water is caused by the presence of calcium and magnesium ions in water. If water contains more than 60 ppm (parts per million) of calcium & magnesium, it is called as hard water.

TYPES OF HARDNESS

- **TEMPORARY HARDNESS**: It is caused by the presence of bicarbonates of calcium & magnesium in water. This can be removed by simply boiling the water.
- **PERMANENT HARDNESS**: It is caused by presence of sulphates & chlorides of calcium & magnesium

REMOVAL OF HARDNESS

- **ALKALI METHOD**: The alkali calcium hydroxide is used to remove the hardness.
- **LIME SODA METHOD**: In this method, sodium carbonate & calcium hydroxide both are used.
- **SEQUESTERING AGENTS**: For e.g. sodium hexa-metaphosphate. These agents react with calcium & magnesium ions forming complex salts.
- **PERMUTIT OR ION EXCHANGE PROCESS**: Zeolites are hydrated silicates of sodium & aluminium. During the ion exchange process, hardness is totally removed.

DETERGENTS

- They are the cleaning agents used in conjunction with water.
- They are of two types:
 - SOAPY DETERGENTS
 - SYNTHETIC DETERGENTS (non soapy).

PARTS OF DETERGENT

- **ACTIVE INGREDIENTS**: In soapy detergents, the active ingredients are obtained from natural oil & fats. The active ingredients in synthetic detergents are the surface active agents or surfactants obtained from petrochemicals.
- **BUILDERS**: A builder is a compound that has no surface active properties but increases the efficiency of the detergent.
- **ADDITIVES**: Added to the detergent, these may be bleaching agents, blueing agents, fluorescent brighteners and so on.

TYPES OF DETERGENTS

➤ 3.LIQUID SYNTHETIC DETERGENTS:

They are light duty detergents used on light soiled clothes or light soil on floors.

They do not contain any bleaches or oxygen for oxidation.

➤ 4.POWDERED SYNTHETIC DETERGENTS:

They have multiple properties in the sense that the ingredients can be varied for multi-purpose.

Hence they can be used for washing floors, tiles, fabric & are available in packs.

TYPES OF DETERGENTS

➤ 1.SOAPS:

Made by the process of saponification wherein fat or oil is subjected to alkali treatment.

It is a anionic surfactant & are more effective in soft water. Scum formation takes place in hard water and is not easily rinsed away.

In hotels it is available in 25g. To 50 g. packs.

➤ 2.SYNTHETIC DETERGENTS: (soapless) :

They have replaced soaps because they have good emulsifying power as well as suspension power.

QUALITIES OF A GOOD DETERGENT

- Should have a good wetting power by reducing the surface tension of water.
- Should have a good emulsifying power in breaking down fat & grease.
- Should have a good suspension power i.e. dirt once removed should not get back to the fabric.
- Should be soluble in all forms of water.
- Should be effective over a wider range of temperature.

QUALITIES OF A GOOD DETERGENT

- Should be bio-degradable.
- Should not damage fabric or effect hand.
- Should clean with minimum agitation.
- Should easily rinse away.

DIFFERENCE BETWEEN SOAP & DETERGENT

SOAP

- Ph value is 8
- Lather formation takes place in soft water.
- Good at removing greasy dirt.
- Good at suspending dirt.
- Does not dissolve properly in cold water.

DETERGENT

- Ph value is 6-7
- Can lather well in hard water also (synthetic detergents)
- Not very good at removing dirt.
- Excellent in suspending dirt.
- Easily dissolves in water at all temperatures.

DIFFERENCE BETWEEN SOAP & DETERGENT

SOAP

- Scum formation in hard water.
- Lathers well in soft water.
- Not good at stain removal
- Yellowing of white fabrics

DETERGENT

- Unaffected by hard water.
- Lathers in other forms of water also.
- Good at stain removal.
- Retains whiteness of white fabrics.

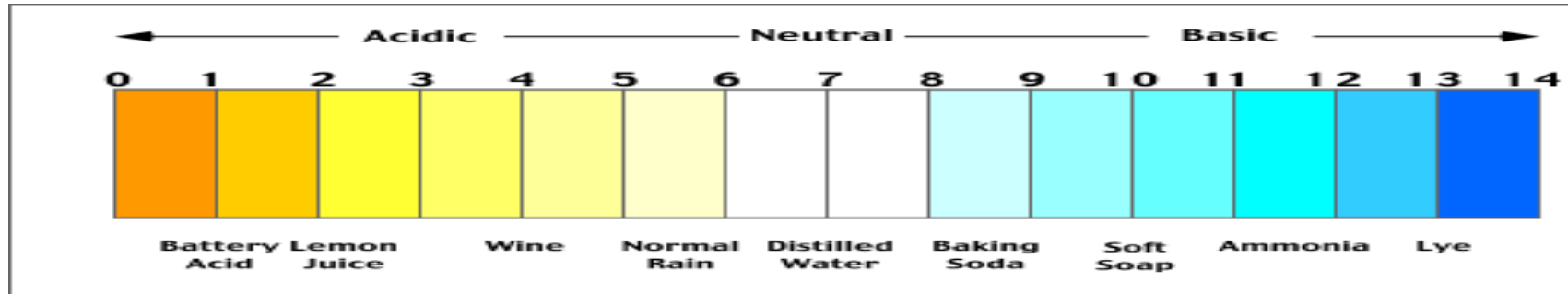
ABRASIVES

- Cleaning depends on the rubbing or scratching properties of the material. E.g. sand paper, feldspar, calcite. If possible, fine abrasives should be used. In a scale of 1 to 10, which shows 1 as talc and 10 as diamond, feldspar has hardness of 6 and calcite as 3.
- FINE ABRASIVES : For e.g. filtered chalk, jeweller's rouge.
- MEDIUM ABRASIVES: For e.g. scouring powder.
- HARD ABRASIVES: sand paper, steel wool.

SOLVENTS

- These chemicals are used for removal of grease, dry-cleaning of fabrics & stain removal. The room should have proper ventilation because they have a strong odour.
- Solvents are inflammable.
- They are strong chemical agents hence used in small amounts.
- They are volatile hence stored in air tight containers.
- Examples: Carbon tetrachloride, Methylated spirit, Per-chloro-ethylene, Turpentine oil, Acetone, White petrol, Amyl acetate.

Ph SCALE



- The pH scale measures how acidic or basic a substance is. It ranges from 0 to 14.
- If a pH is lower than 7 it indicates the solution is an acid.
- If it is above 7 it is a base or Alkaline.
- If a pH is a 7 it is neutral. Scientists use a pH number to show the strength of an acid or base. A pH is measured by dipping litmus into solution such as water or other substances.

CLASSIFICATION OF CLEANING AGENTS

- ACID CLEANERS
- ALKALI CLEANERS:..
- NEUTRAL CLEANERS:

ACID CLEANERS

- They include cleaning agents with Ph value below 7.
- They are used for cleaning toilets & removing stains from baths & washbasin.
- They vary in strength with weak acids such as acetic acid(pH 3) to strong acids such as hydrochloric acid (pH 1).

ALKALI CLEANERS

- (pH above 7) .
- They are good at removing grease stains.
- Since they are strong, rubber gloves should be worn.
- Caustic soda based alkalis are used to clear blocked drains. E.g. baking soda (sodium bicarbonate), washing soda(sodium carbonate), caustic soda(sodium hydroxide), Liquid ammonia, hydrogen peroxide.

NEUTRAL CLEANERS

- (pH 7).
- Include common/general purpose detergents for washing dishes, damp dusting, mopping & routine cleaning tasks.

POLISHES

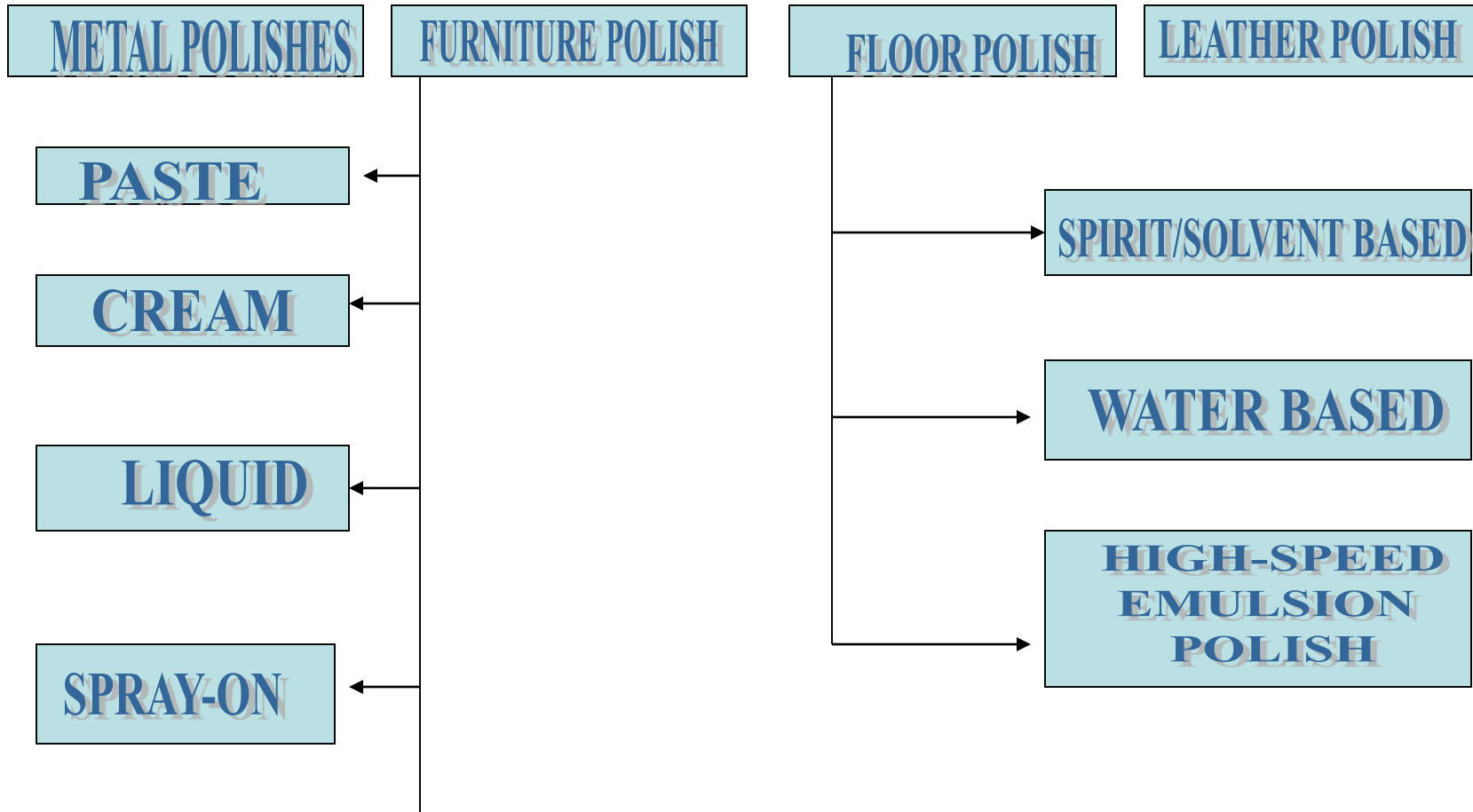
- Polishes are meant to provide protection to surface against dirt, stain, finger marks & scratches.
- They create an attractive sheen on the surface.
- Before applying polish, the surface should be dried and cleaned to remove any dirt. A thin layer of polish should be applied. Excess polish makes the surface sticky.
- Buff the polish with rags or dusters preferably one with a napped surface.

POLISHES(CONTD.)

- Polish should be done in a well ventilated room. Before applying fresh polish, the older polish should be removed from the surface.
- High speed emulsion polish require the use of floor polishing machines.
- Furniture polish can be paste, cream, liquid, spirit based or water.

CLASSIFICATION OF POLISHES

POLISHES



FLOOR SEALS

- Floor seals are applied to floors which form a thin layer of plastic or a semi permanent finish that acts as a protective layer.
- They are grouped as PERMEABLE, SEMI-PERMEABLE & IMPERMEABLE.
- Impermeable seals should not be used on wooden or cork floors as moisture naturally found on these floors will get entrapped and may disintegrate the floor.
- Impermeable seals may be used on PVC s , thermoplastic tiles & rubber floors.

FUNCTIONS OF FLOOR SEALS

- Floor seal increases the shelf life of the floor by reducing the wear & tear due to usage.
- They improve on the appearance of the floor & also provide attractive gloss.
- They do not allow any dirt, stain to penetrate.
- Maintenance of the floor is reduced as it forms a protective coat over the floor.

TYPES OF FLOOR SEALS

- OLEO RESINOUS SEALERS
- ONE POT PLASTIC CLEANERS
- TWO POT PLASTIC CLEANERS
- PIGMENTED SEALER
- WATER BASED SEALERS.
- SILICATE DRESSINGS



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OLEO RESINOUS

- They are clear, solvent based cleaners used on wood, cork floors.
- They consist of oil, resins & solvents.
- They not only impart gloss to the surface but also penetrate the floor.

ONE POT PLASTIC SEALERS

- Also called one can sealers.
- They impart gloss to the surface but do not penetrate it hence used on wood, cork etc.
- Three types of one plastic seals are:
 - A. Urea formaldehyde resin with an acid catalyst.
 - B. Oil modified polyurethane.
 - C. Moisture cured polyurethane.

TWO POT PLASTIC SEALERS

- It consists of two components. One component is the base which may be formaldehyde or polyurethane & the second component is the accelerator or hardener.
- The two components are kept separate & when required they are mixed in recommended proportions otherwise the sealer is not effective & it becomes patchy.

PIGMENTED SEALERS

- These sealers contain colour pigments which not only impart colour but also strengthen the sealer.
- They are used in concrete, wood, magnesite, asphalt & stone floors.
- They are of following types:
 - A. One-pot synthetic sealers
 - B. Two pot poly-urethane.

WATER BASED SEALERS

- They are composed of acrylic resins (made from a particular organic acid) & a plasticizer.
- They penetrate the pores on the floor surface to provide a plastic skin.
- They may be used on marble, terrazzo, magnesite, PVCs, stone tiles.

SILICATE DRESSINGS

- They consist of a base of sodium silicate dissolved in water.
- Sodium silicate reacts with the lime in concrete floors to form insoluble calcium silicate.
- Water evaporates & the silicate forms a layer of silicate glass on the surface.
- Used on concrete & stone floors.

Review

- Application
- Features
- Classification

Exercise

- What is the characteristic of good cleaning agent?
- Classify different cleaning agent used in Hospitality Industry?
- What is oleo resinous?

Thank you

LINK

➤ www.youtube.com