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DETERGENT POWDER PLANT

DETERGENT POWDER MEANS: -

Defining, detergent powder is in the form of a powder that is used to wash clothes, utensils, floors and fabrics etc. It is also known as washing powder or laundry powder.

Detergent powder is one of the most traditional washing agent, with two main advantages: **cheaper** and **power against heavy stains**.

It leads to the tremendous popularity worldwide, while its affordability makes it a particularly convenient market product for countries globally.

We the **Esteem Engineers** is manufacturer and supplier of **Granulated Detergent Powder Plant** in India and abroad since last 30 years.

MANUFACTURING PROCESS: -

(A) DRY MIXING: -

Soda Ash and Sodium Carbonate in required proportions are mixed inside a mixer usually in **Plough Share Mixer** (**PSM**) for 2-5 minutes. After that Acid Slurry commonly known as **LABSA (Linear Alkyl Benzene Sulphonic Acid)** is added slowly through spray nozzles in required quantity and duration. The neutralization of soda ash and acid slurry starts and as a result of exothermic reaction temperature of the mixture increases and its colour becomes brownish. The **agglomeration** or **granulation** takes place inside the mixer due to its shape and rotation of ploughs.

Plough Share Mixer consists of a stationary horizontal shell with rotating shaft. Ploughs and scrapper are fitted with the shaft at different orientations. The shape and speed of ploughs are determined based on proper mixing and **agglomeration** of the powder should take place. High speed **Choppers** are fitted with the shell at a proper angle so that the lumps formed during mixing can be cut and reduced in size. For charging and discharging materials suitable size of nozzles and door is provided. For liquid injection nozzles with header pipes and spray nozzles are fitted.

The drive unit consisting of Motor and Gear Box with suitable reduction ratio are fitted with the shaft.

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PLOUGH SHEAR MIXER

Some other additives are also added in the mixer to enhance the different properties of the detergent powder like-

Builders and Fillers-

Some builders like **sodium silicate** are added to increase the efficiency of surfactants as well as to prevent corrosion inside the washing machine. **Soluble salts** which neutralizes acids are combined with surfactants to make a base of laundry detergent suitable for stain removal. **STPP (sodium tripolyphosphate)** is also used as a builder. **Sodium hypochlorite** solution used as a bleaching agent are also added, which helps in making the product whiter and brighter.

Surfactants- Surfactants expedites the cleaning action of the detergent powder. It is used to create foams which helps dirt particles to keep suspended and can be thrown out of the cloth with the help of water jet. **LABSA** is commonly used as surfactant. Some other surfactants are **SLES (Sodium Lauryl Ether Sulphate)**, **Alpha Olefin Sulfonate (AOS).**

Enzymes- It strengthens the power of detergent powder against soil, dirt. It reduces washing time and gives better result at room temperature.

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Silica- Anhydrous silica fumes are used to increase the flow ability or in other words it helps in making the detergent powder “free- flowing”.

The proportions of these ingredients depend on the final product and brand name.

(B) SIEVING: -

After the mix powder comes out of the mixer, it is stored for some time in big silos for cooling. This powder is **hygroscopic** in nature. It is important that it should be prevented from absorbing moisture from atmosphere. For transportation bucket elevators or conveyor belts are commonly used.

A **Vibro Siever** is an equipment which segregates the powder size wise. It is equipped with different size of mesh decks used as filters, stacked one over another. A mesh size of 8-30 nos. are commonly used. Material is poured on the top of the deck and it moves towards nozzles due to its vibratory motion. During the travel it gets filtered and separated according to different wise.

Vibro Siever

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The cooled powder is fed to the vibro sievers where oversized particles are separated. Almost 10-20 % of the total powder separated (oversized) are sent to **cage mill** for size reduction.

The best detergent powders are lightweight and have good free-flowing properties. Their average bulk density ranges between 0.8 – 0.9 gm/cc, comprising hollow particles with dimensions of 0.2 - 2.5mm. This detergent powder is sent to **Rotary Blender** for further process.

(C) Size Reduction :-

A **Cage Mill** is the equipment meant to break the oversized particles or lumps which are formed during mixing process in the **PSM**. After sieving, the oversized or lumps in the detergent powder is separated and passed through the cage mill. The powder is charged from top and discharged from bottom. Inside the **Cage Mill** there is a rotating part which breaks the lumps into small particles.

Cage Mill

All the material collected from cage mill is sent for sieving again. This cycle is repeated till all the oversized particles are completed.

(D) Blending: -

This is the last operation manufacturing point of view of the detergent powder.

The blending process is carried out inside a **Rotary Blender** where some additives are mixed. There are some items which can not be mixed in initial stage of mixing in **PSM**. The properties of those items will be destroyed due to high shear in PSM at higher temperature. Also there are chances of fading out of the colours and fragrances.

A **Rotary Blender** is a horizontal shell having straight length and both end cone, rotating at slow speed. Inside the drum there are baffles suitably shaped and positioned at different places for proper mixing of powder without breaking the particles. Because of slow speed the particles roll over other and there are minimum chances of attrition and get mixed. Suitable guided baffles discharge the material in a particular direction.

Rotary Blender

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The items to be mixed in blender: -
Sodium sulphate are added to prevent caking and to maintain standard weight.
Perfumes or **Fragrances,** are used to cover chemical scents and dirt odors and to provide a good smell.
Colourful speckles are used to enhance the competitive advantage in the laundry detergent powder market as an additive and decorative use.
The finished powder then travels to the storage bins and packing machines for final packing.
(E) Packing & Labeling: -
The last step is to pack the detergent powder with **Brand Name**.
Conveyor belt, packing machine, silos, load cells are the main parts required for this.

We can supply wide range of plant capacities, customized based on your requirement, ranging from table top size for R & D purpose of 100 kg/hr. to plant size of 10000 kg/hr.
The MOC of the equipments are usually considered to be **SS 316 L.**
The power consumption is few kW for pilot plant to 400 kW for manufacturing plants depending upon the capacities.

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