

Spray dryer "Detergents"

The advantages :-

- 1- the dry particle can easily controlled
- 2- Many heat sensitive products can be spray dried easily at relatively high inlet temp
- 3- short residence time is required
- 4- Minimum over all Flavour loss in Food industry.
- 5 Ensures high product quality.

Dis Advantage

- 1- The equipment is very costly and bulky
- 2- cleaning is time consuming
- 3- A lot of heat is wasted 'thermal efficiency' is low.

is low.

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①/D

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operating condition..

- 1- inlet "T" : $180 - 250^{\circ}\text{C}$
- 2- outlet T : $80 - 115$

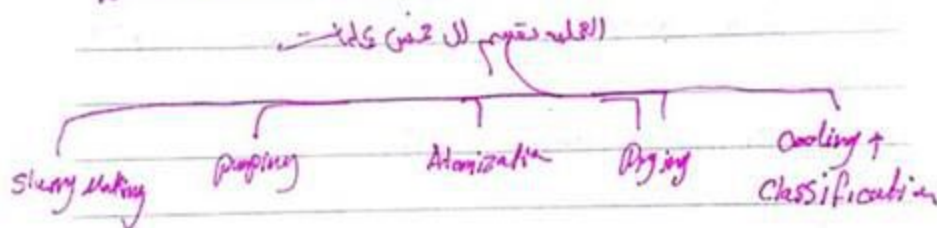
General idea

detergent slurry + hot air $\rightarrow$ detergent granule

1- efficient

2- constant "low"

المزايا



Slurry Making

object $\rightarrow$ making homogeneous slurry

composition

operation

with minimum water content To decrease the

drying load

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No. _____ Date: _____

Why smaller towers run with smaller nozzles?

- 1- to avoid build up caused by wet drops before they have dried
- 2- Residence time

ما هي الاسباب التي قد تؤدي الى انسداد رذاذ

Spray Nozzle

Nozzle wear

Nozzle blockages

تآكل رذاذ
انسداد رذاذ

هذا ما قد يحدث في Nozzle بعد فترة من الزمن لأنه رذاذ رطب

Over-agglomeration and too many coarse particles.

4- Drying "Drying"

Counter-current spray drying towers are used, (3-10)m

تجفيف برج رذاذ متعاكس

→ minimize any contact of the hot air with build up produced

2- Reduce the amount of browning

من أجل ما كان من البrowning

→ Leading potential explosion → Fire in the tower

No. _____ Date: _____

تجفيف برج رذاذ متعاكس oil

Low poor combustion can lead to black specks entering

No: _____ Date: _____

2- Pumping:-

من استخدام

لأننا نريد أن يكون الماء الموجود في الدقائق صغيرا حتى لا

block the Atomization
Nozzles← inorganic lumps
الكائنات
lumps

So we pump the mix through a filter and provide
a disintegrator to break up any such lumps before
passing

وإذا ما ترفع الغبار استخدم
piston pumps

3- Atomization:-

object:- create drops small enough to dry in the
spray drying tower

فإننا نحتاج إلى استخدام

high-pressure nozzles

← Hollow Cone pressure
nozzles
Swirl Nozzles

4/D

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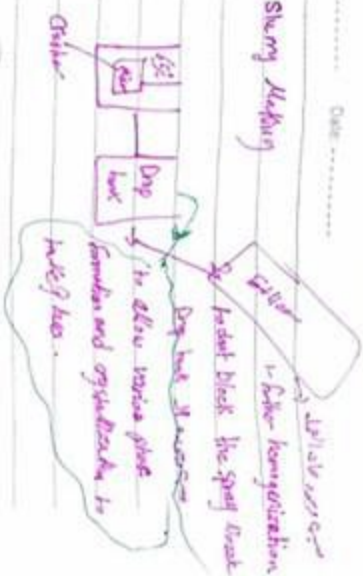
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have dried

مستند جديد 2...

Slurry Walling



STP is significant of subgrade formation

مهم

1. good separating properties

2

2. provide ballast capacity, robust granule.

3. good contact for water molecules.

Slurry walling. It also is used for

it hydrates to form hydrate during the slurry walling
as the hydration reduces the free water in the mix
and can have big impact on viscosity.

⇒ STP is sensitive to T

low T more hydration

3/D

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No: Date:

2- Slurry Walling

→

T-sensitive Additives لا تتحمل الحرارة
 air lift انما تدخل معكم عن طريق
 وهي أداة بقفل البلادر الذي
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No:----- Date:-----

The air lift is consider as initial classification
 of the powder coz the big lumps are not
 transported up and fine particles

powder properties:

1- Density $250 - 550 \text{ kg/m}^3$

low density $\rightarrow$ high water content, high Air T, high Cor

2- particle size distribution: $(400 - 500) \text{ um}$

3- cake strength - flow:

4- Solubility

في الارتفاع من غير ان يدخل في spray dryer
 Makeup في الجدران واما في tone-mouths في wet slurry في الارتفاع
 walls

1- This Makeup lead to long lumps inside the tone-

2- reducing thermal efficiency

3- if the Makeup near the hot air inlet T will make

Overheating and generate brown & black speckles

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بدل تنقي oil الى air stream في furnace

Due poor combustion can lead to black specks entering the tower and causing discoloration of the brown powder

"Cyclone" لعل مستخدم

إذا كان في خط في توزيع الجزيئات رج يلجب poor product quality

brown
over dried
under dried
Sticky

يمكن بعض الجزيئات يكون

1- to stabilize the airflow + ← Swirl مستخدم

2- decrease the exhaust T

وبوضع فوق ال tower في cyclone

5- Cooling and Classification

الحرارة في داخل من tower حرارة 70°

T-sensitive Additives وفي شمع لل

air lift أيضا تدخل معهم عن طريق

وفي أدناه ينفصل البلادر لذلك

6/0

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The air lift is considered as initial classification of the powder coz the big lumps are not transported up and fine particles