



PIN: 051523207 T and contact cellular; 0736 322 749 / 0786 403 634 / Landline; 020 - 5291385

Note on the Cadpress studies

Date of study: 6th of July, 2016

1. Summary of measurable quality V/S speed of machinery

SPEED	LHS DATA- kP	RHS DATA - kP	LHS – FRIABILITY%	RHS – FRIABILITY%
11	14.1	9.61	1.57%	2.9%
After balancing RHS-LHS compression power	10.21	10.35	1.63%	1.71%
15	9.5	9.3	2.16%	2.0%
20	10.3	10.5	4.1%	2.7%

2. Key Observations:

1. The compression power on the two sides of the machine was unbalanced. The balancing was restored after calibrating the loading elements of both LHS and RHS on a make shift mode.
2. The variations in weight of the tablets are substantially high owing to the high frictional resistance of the powder in the hopper.
3. The spread of powder around the compressing elements and the plunger are enormous infringing the capabilities of the plunger in the compressing motion.
4. The motion is cranky and several electrical interruptions were observed inclusive of the inverter overload. The implications are related to the wiring network in the panel that would need to be corrected when we are eventually installing the rectifiers.



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5. The friability percentage is clearly increasing with speed. Other properties of the tablet like strength and weight variations are not registering any trend with the changes in speed.

3. Solutions:

A. Process:

i) Moisture in the powder might be on the lower side causing this increase in friability with speed since this is fundamentally a factor attributed to the abrasion on the surface and the affinity of the powder particles to cling on during the compacting process of the compression.

To establish the relationship as explained above, we might need to compare the powder of the wet granulation process and run one batch at the desired speed of 30-35 rpm and log in the usual properties of the tablet like strength, weight variation and the friability percentage.

If the trials prove successful, then we might need to operate the compression area as well as the blender area with the moisture grain content of 25 instead of the current 17-19 bandwidth. That would imply a high RH of around 65-67% with a temperature of 23- 25. The psychrometric chart is herein enclosed as a ready reference.

ii) The powder batches could possibly be pegged for FIFO (first in and first out system) implementation to ensure that the properties are consistent between the batches.

B. Equipment:

i) The hopper can be re-engineered through a prototype fabrication to eliminate some obvious design and surface characteristics and ensure free movement of the powder with minimized friction. Local workshops are well equipped in Nairobi for creating these prototypes on the machine and can be designed for removing the defects on a retrofitting model.

ii) The plungers and the compressing elements need a thorough overhaul to ensure equilibrium at higher speeds since the motion is observed cranky even at speeds of 20 rpm.



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iii) Wiring network within the panel need to be changed selectively while we are correcting the B-phase imbalances and installing the rectifiers for the control of the harmonics.

iv) The fundamental engineering principles of drive quality are defined by the electromotive power of the motor and shall be evident once the process of correcting the motor for phase imbalances and power factor (PF) are incorporated.

4. Immediate recommendations for quick-fix solutions:

i) We run the FBD-granulated material for one batch at the desired 30-35 rpm to observe the properties and equipment performance.

ii) We can adjust the CADPRESS on direct compression with 65-67% RH and observe the friability properties at speeds of 20, 25 and 30 progressively.

5. We can process the immediate recommendations on Friday – dated 8th of July, 2016 and report the findings for long term implementation.

Warm regards,

Debashish Banerjee

Dated: 7th of July, 2016

Nairobi