

Troubleshooting Guide

Preparing for
the perfect
tableting trial?
Why not!

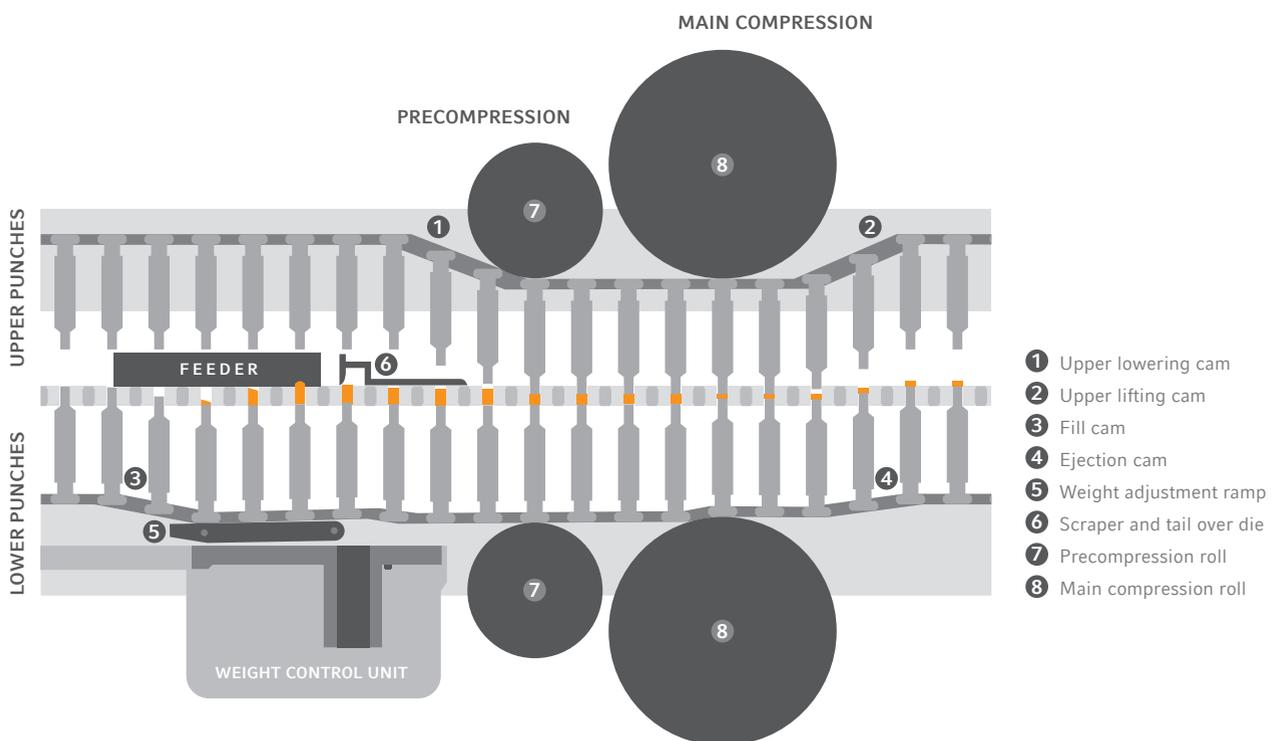
Possible reasons and remedies
for common tablet defects.

The tableting process and its challenges

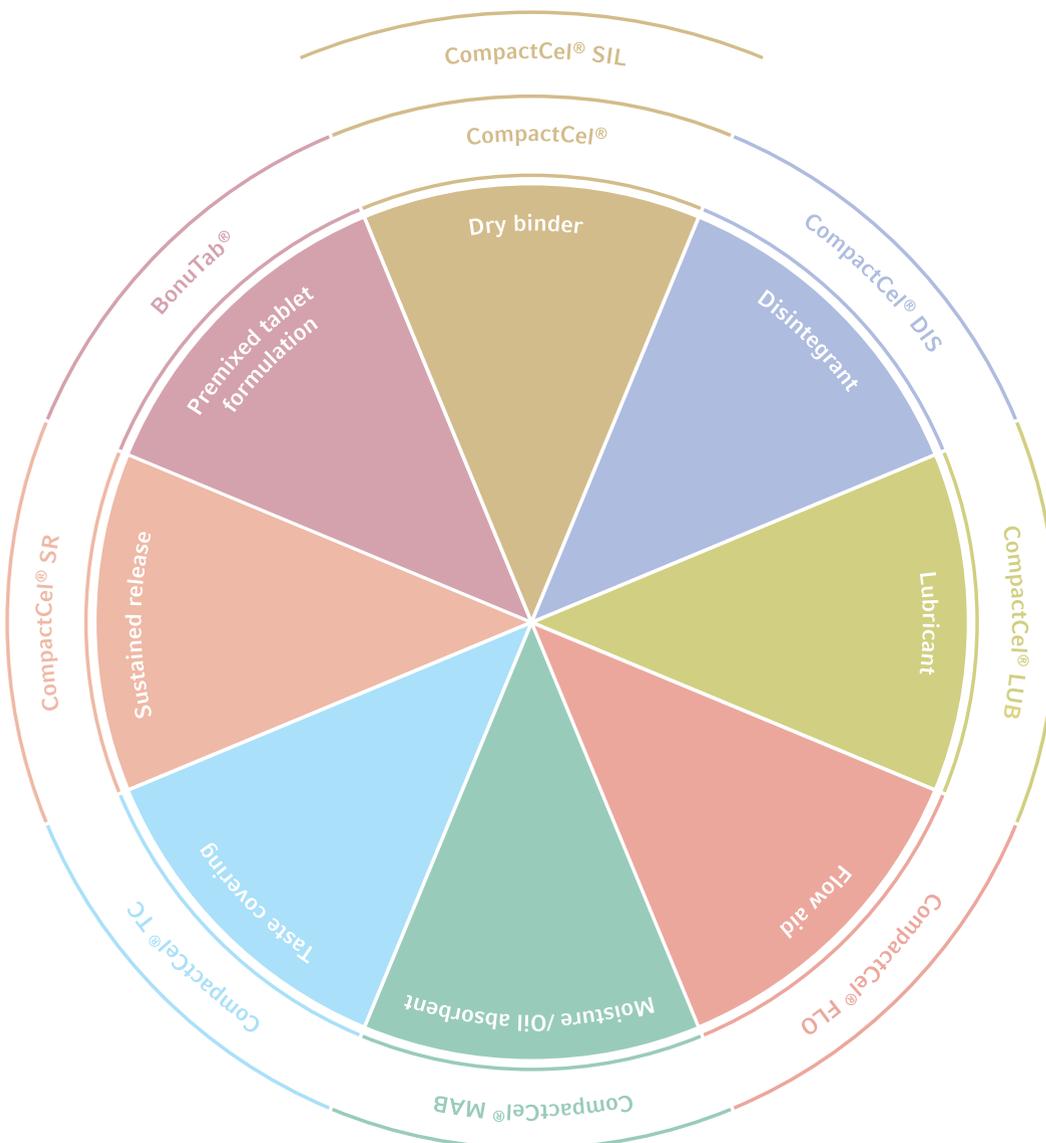
Lots of parameters have to be considered before and during a tableting process. Sometimes it is necessary to adjust parameters in order to achieve the best possible results. But do you always know which modifications are needed to improve the process? Has the problem been caused by the machine, tablet mass or both?

There are a lot of factors that can lead to a suboptimal result. The tablet core may become too soft or show high abrasion. Incorrect process parameters, such as too fast press speed or filling time or too low or high pressure also lead to defects.

This Troubleshooting Guide shows the most common tablet defects that can be avoided easily. It helps you find the best way to achieve perfect results. Furthermore, we provide on-site technical services for our customers and help in the research for new solutions.



Choose our ready-to-use tableting premixes to improve the production process. Free flowing binders, sustained release formulations, lubricants and fully formulated tableting/encapsulation premixes provide best assistance for your tableting activities. Whether standard or tailor-made formulation for dietary supplements and pharmaceutical applications.



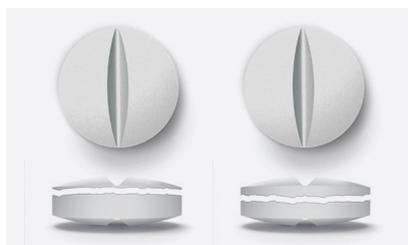
Problem

Capping & Lamination

Sticking to punches

Description

Horizontal splitting of tablet at the top (capping) or anywhere but the top (lamination)



Granulate of a formulation is sticking to the face of the press punch



Possible reason

- Too many fine particles in the granulate
- Separation of the granulate
- Too much of hydrophobic lubricant
- No suitable lubricant
- Not enough or not suitable binder
- Low moisture content
- API content too high
- Compression force too high 🛠️
- Speed of the tablet press too high 🛠️
- Too much air trapped in the pre-compression 🛠️
- Tablet press tool defective 🛠️

- The granulate was not completely dried
- Lubricant content too low
- Too much binder used
- Oily or waxy materials used
- Too soft or weak granulates
- Compression too high or too low 🛠️
- The product became too warm 🛠️
- Rough or scratched punch faces 🛠️

Remedy

- Change the quantities in the granulate
- Use enough and an efficient binding agent
- Adjust used lubricant
- Add adsorbent agent
- Moisturize or dry the granulates
- Reduce amount of API
- Adjust the pressure for compression (use pre-compression) 🛠️
- Decrease speed of the tablet press 🛠️
- Use more suitable punches (conical) 🛠️

- Completely dry the granulate
- Use enough and an efficient lubricant
- Add suitable binder
- Modify mixing process and add an absorbent
- Adjust the compression force 🛠️
- Produce a thinner tablet (height) 🛠️
- Polish the surface of the punch 🛠️

🛠️ = The problem can be solved by adjusting the machine settings

Cracking

Small, fine cracks observed on the upper and lower surface or on the sidewall



- The granulate is too large
- The granulate is too dry
- Tablets expand
- Granulation too cold
- Tablet expands on ejection due to air entrapment

- Reduce granulate size by adding more fine particles
- Moisturize or dry the granulate and add binder
- Improve granulation, add dry binders
- Adjust ambient temperature
- Use conical die

Chipping

Occurs when the edges of the tablets break during the press process or during the handling and coating



- Sticking on punch faces
- Too dry granulate
- Too much binding causes chipping at bottom
- Edge of punch face turned inside/inward
- Concavity too deep to compress properly

- Use suitable binding agent or use dry binders
- Dry the granulate properly or increase lubricant
- Add hygroscopic substances
- Reduce concavity of punch faces
- Use flat punches
- Polish the punch edges

Binding

The term is used when the tablets adhere, seize, or tear in the die

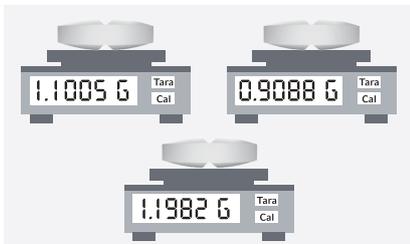


- Too much moisture in the granulate
- Too little lubricant in the granulate
- Granulate too hard for the lubricant to be effective
- Granulate material sticks to the die
- Punch is not suitable anymore

- Increase drying time of the granulate
- Use enough and an efficient lubricant
- If too warm, reduce temperature
- Increase space for ejection
- Replace punch

Weight variations

High variation of tablet weight



- High variation in granulate density
- Die not completely filled
- High variation of granulate particle size
- Flowability insufficient
- Press speed too high/filling time too short 🛠️

- Weight differences can be reduced by granulation and compaction
- Avoid free fall of the granulate (to prevent decomposition)
- Use flowing enhancers to optimize flowability of the granulate or powder blend
- Reduce press speed / increase filling time 🛠️

Tablet hardness

Tablet breaks during ejection or handling of the tablets

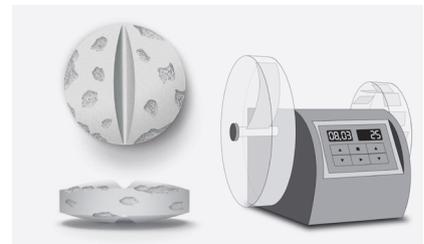


- Variation in bulk density
- Inhomogeneity of granulate particle size
- Tablet hardness varies with the weight of the tablet 🛠️
- The ejection blade is too old or damaged 🛠️

- Achieve homogeneous bulk density
- Use enough and an efficient binding agent
- Control the tablet weight
- Use suitable ingredients for good compacting properties
- Increase the compression force 🛠️
- The eject blade must be checked or replaced 🛠️

Friability

High degree of abrasion after mechanical stress



- Too large particles in the granulate break apart at higher compression forces
- Entrapped air can cause the tablet to break apart 🛠️
- Tablet breaks during ejection 🛠️
- Lower compression may not be enough to bind particles together 🛠️

- Powder should be more cohesive
- Use enough and an efficient binding agent
- Use suitable binders
- Control tablet weight
- Slowing the press will extend dwell time and give the air more time to escape 🛠️
- Control settings on tableting machine 🛠️
- Check tableting tool 🛠️

More support? Why not!
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Mottling of tablet

Is used to describe an inhomogeneous distribution of color in a tablet

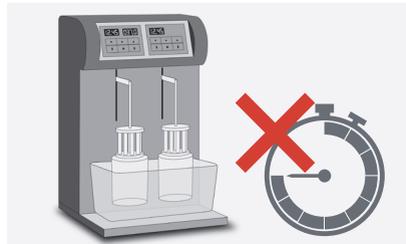


- A colored drug used along with colorless or white-colored excipients
- A dye migrates to the surface of granulate while drying
- Improperly mixed dye, especially during direct compression
- Improper mixing of a colored binder solution

- Use suitable colorants
- Change the solvent system & binder
- Reduce drying temperature and aim for smaller particle size for granulate
- Mix properly and reduce particle size to prevent decomposition
- Incorporate dry color additive during powder blending step, then add fine powdered adhesives and mix properly – finally add granulating liquid

Prolonged dissolution/disintegration

API is not released within required time



- Too much binder
- No disintegrant
- Too hard compression force used
- No water soluble excipients are used

- Use less binder
- Use disintegrant or superdisintegrant
- Decrease compression force
- Reformulate or use proper disintegrant

General Information on BIOGRUND

Since 1999, **BIOGRUND** has been the specialist for the homogeneous mixing of excipients and carriers. With locations in Germany, Switzerland, America and Russia, we support the food supplement and pharmaceutical industry in the development, formulation and production of solid oral dosage forms. The tailor-made and ready-to-use special powder mixtures for film coating, sugar-coating, coloring and tableting enable optimum results in a short time. Easy, fast and reliable!

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