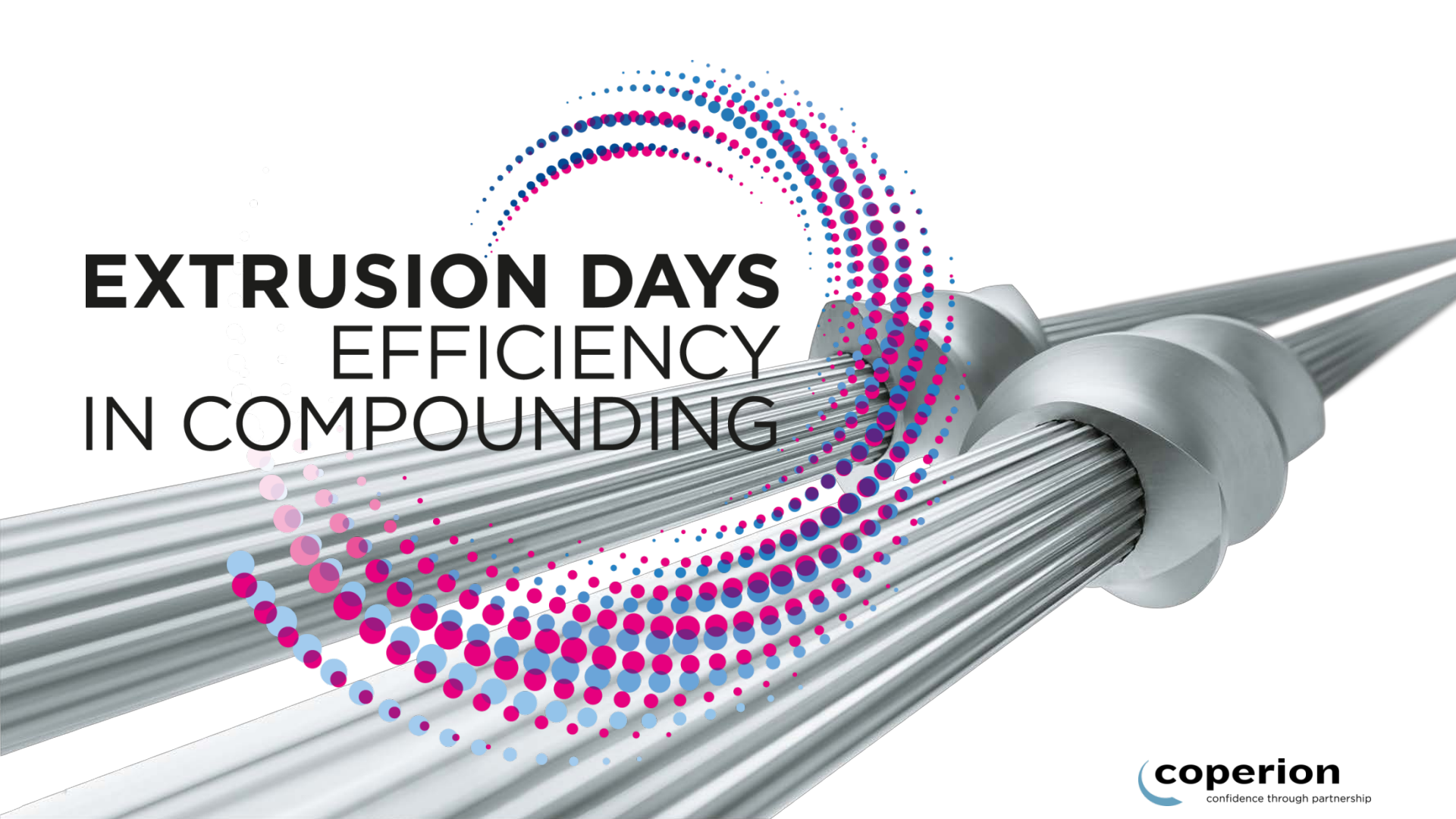
EXTRUSION DAYS
EFFICIENCY IN COMPOUNDING



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Latest Raw Material Feeding Technology & Developments for Improved Processes

Jay Daniel
Business Unit Manager - ECK

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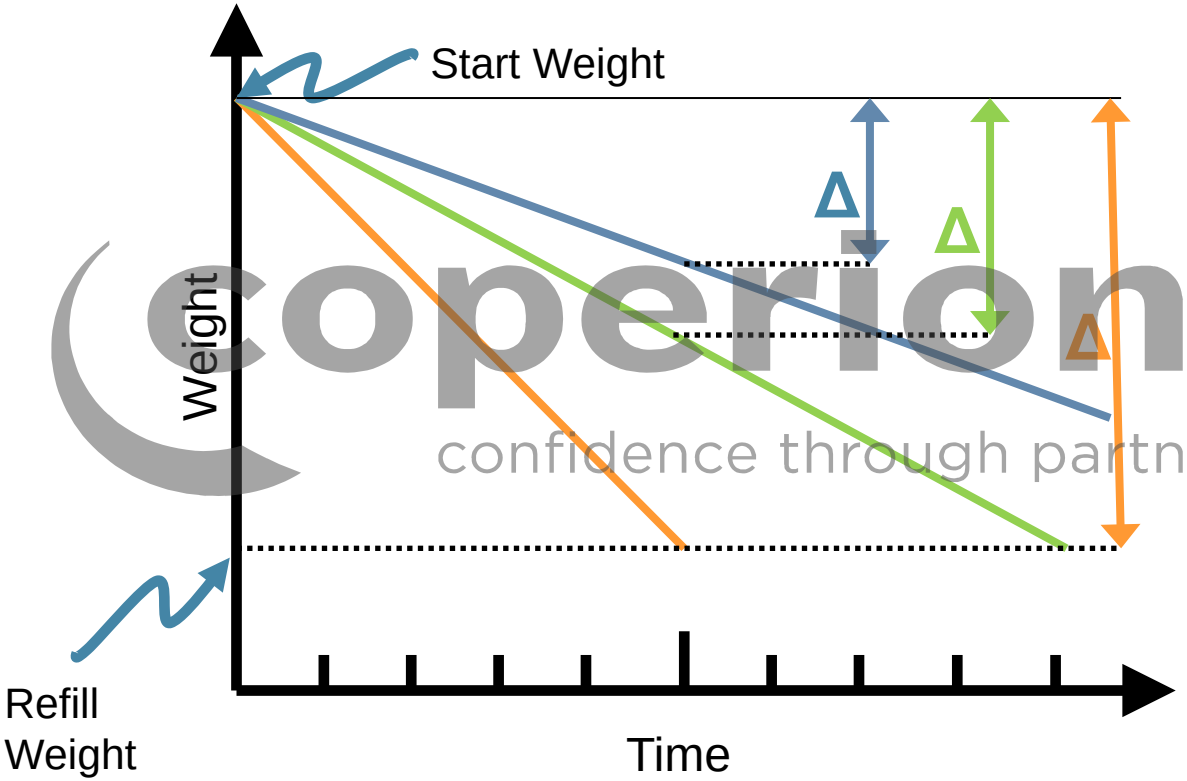
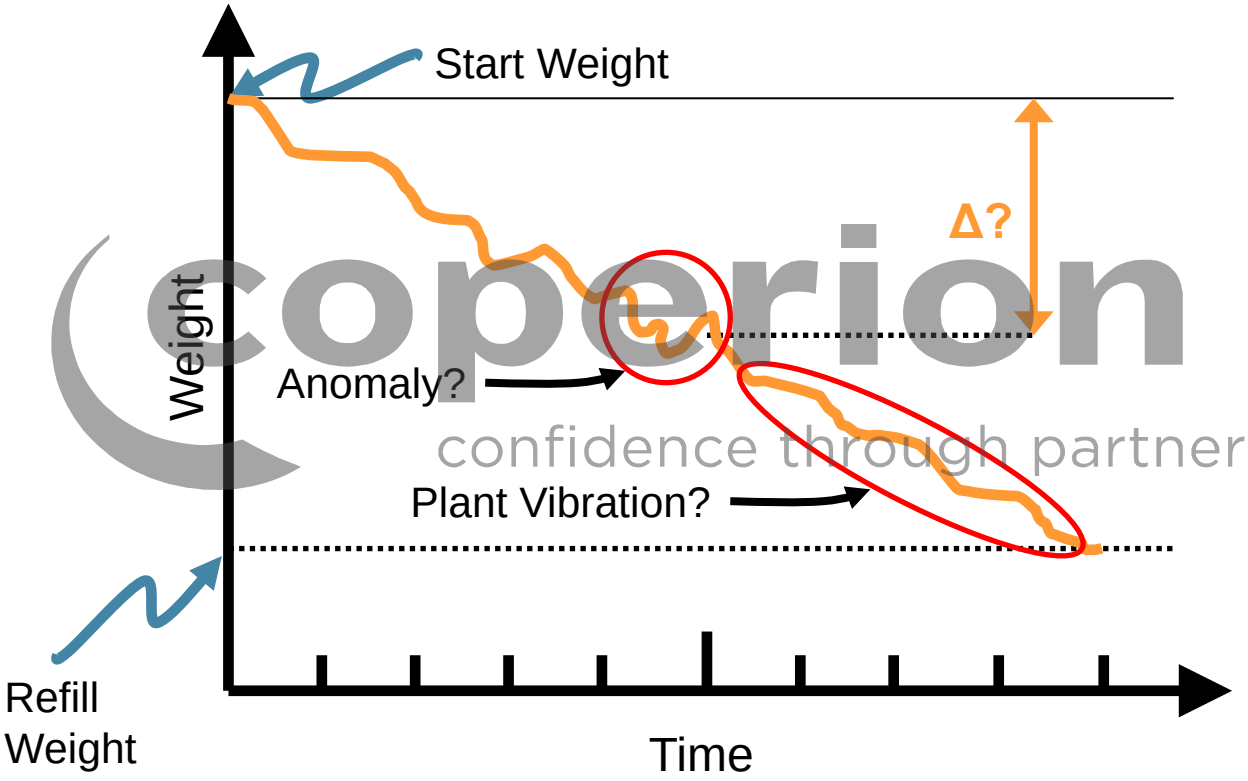
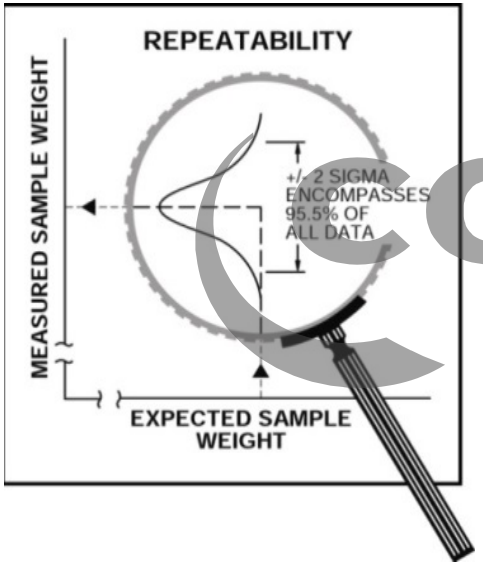
Continuous Feeding Theory

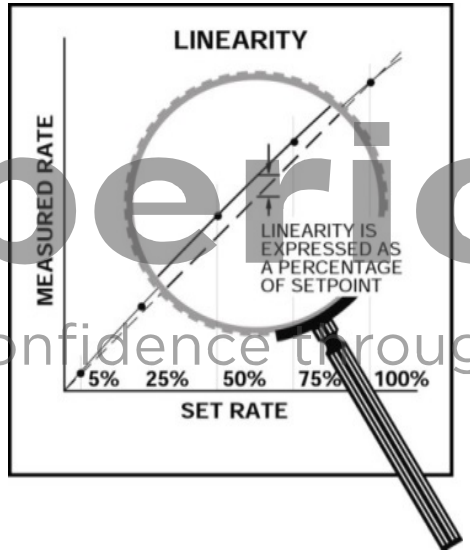


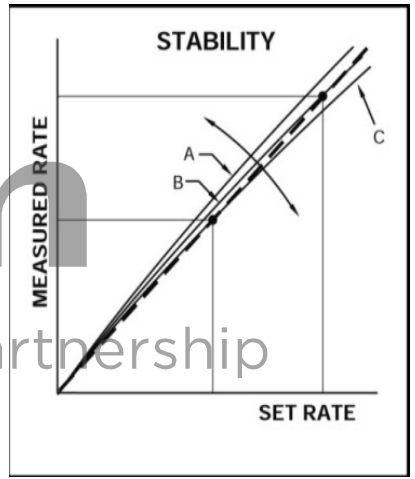
Continuous Feeding Reality



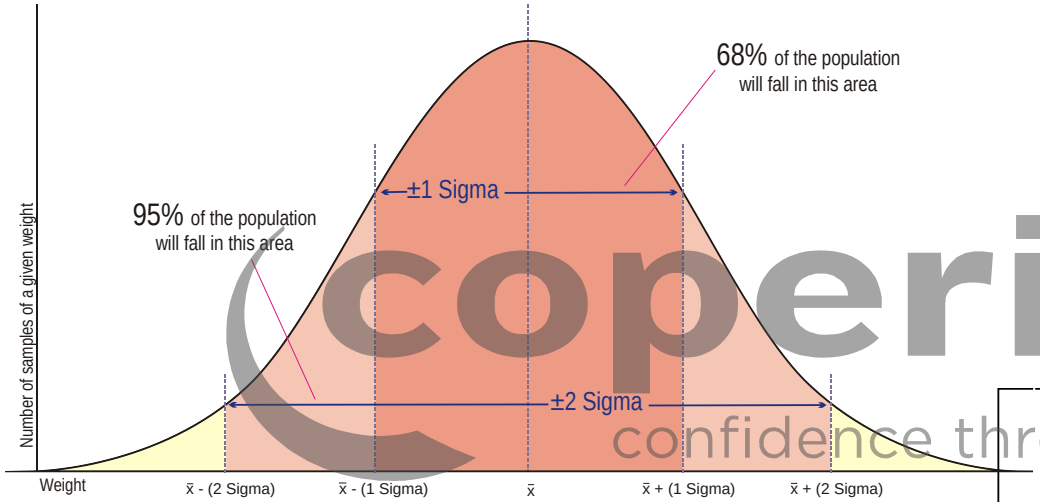
Quality Metrics – Continuous Feeding

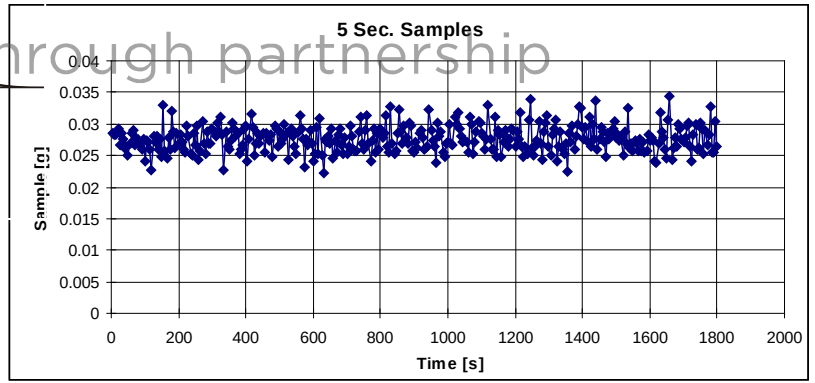






Repeatability – In Detail

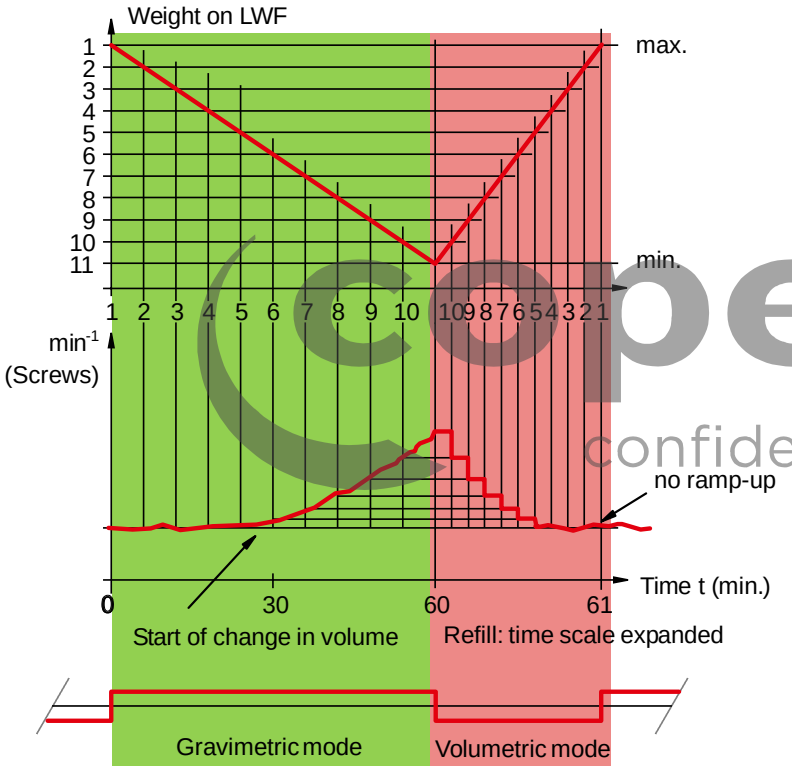




Example Repeatability Standard:

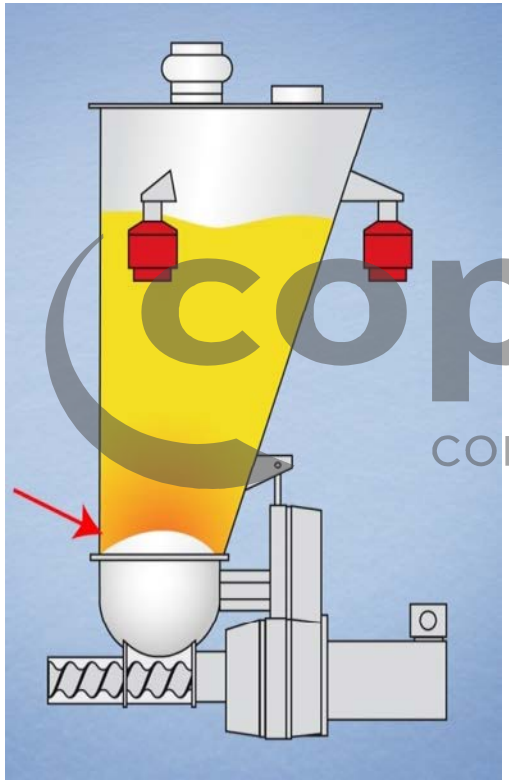
+/- .25% of sample at 2-sigma, based upon minimum of 30 samples.

Feeder Refill - Optimization



- Tracking material density based on weight pressure head during feeding is used to adjust motor speed and maximize accuracy during refill.
- Minimizes disturbance to the control algorithm after refill and eliminates overshoot and "hunting."
- More advanced refill handling allows for more frequent refills, smaller feeder and scale systems, and therefore greater feed accuracy.

Material Flow Issues

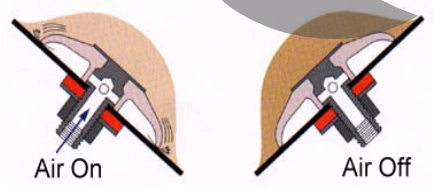


Complete Material "Bridge"

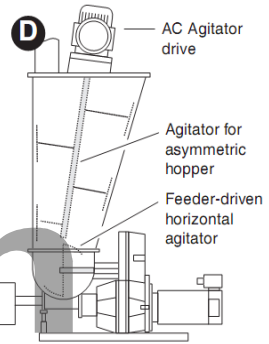
Some materials exhibit poor flow characteristics and may exhibit several severe issues:

- "Rat-Holes" where a narrow column of material in the center of the hopper will flow, but eventually starve the discharge device of material.
- Self-supporting "bridges" where the material completely suspends itself in the hopper while the discharge bowl/trough an discharge device are starved of material.

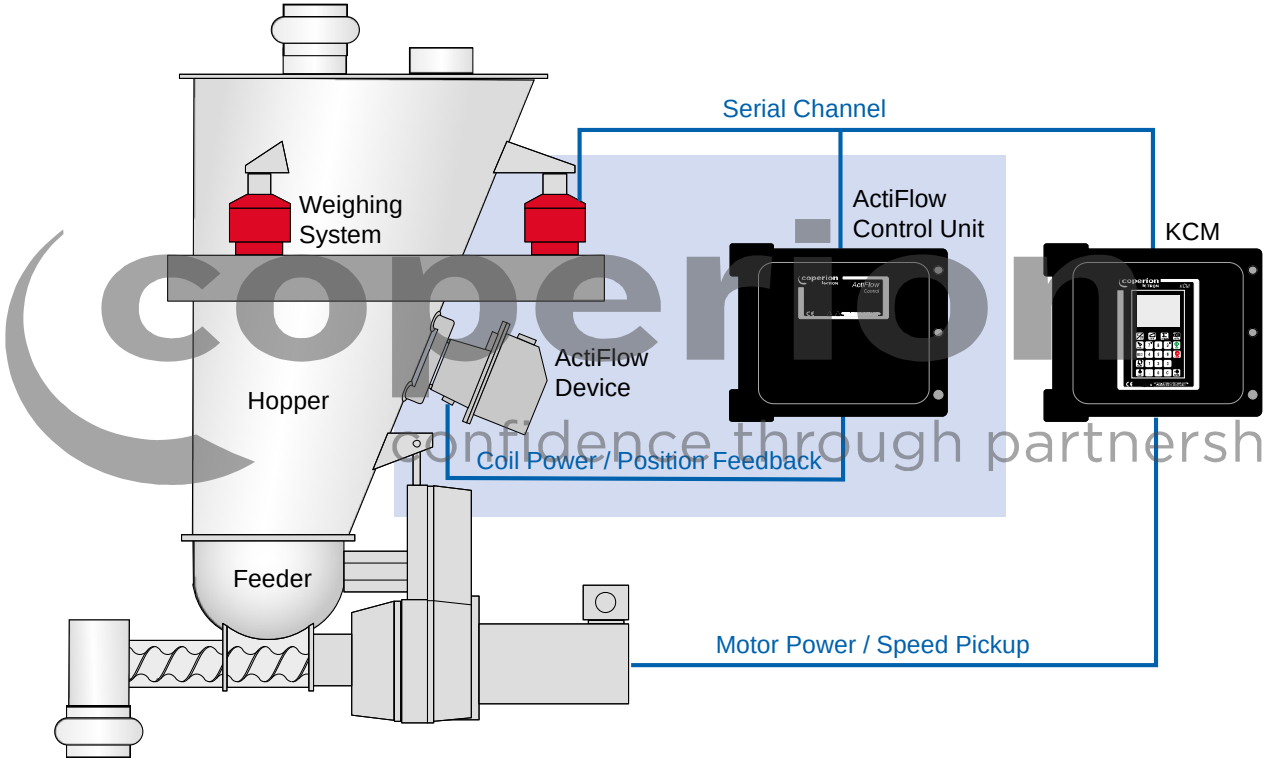
Material Flow Issues – Traditional Solutions



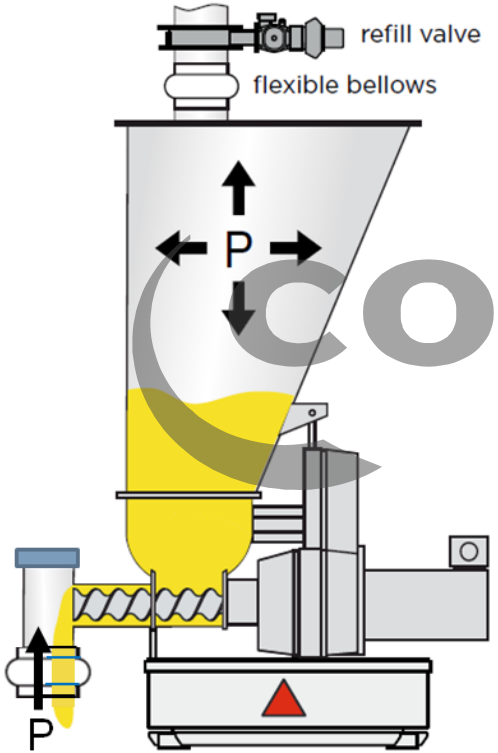
Solutions
Hopper Agitator Blades
Flexible Elastomer Liners (e.g. FlexWall, Shear Hoppers)
Bin Vibrators
Air Injectors / Fluidizers
Elastomer Coatings



Material Flow Issues – Detection and Prevention

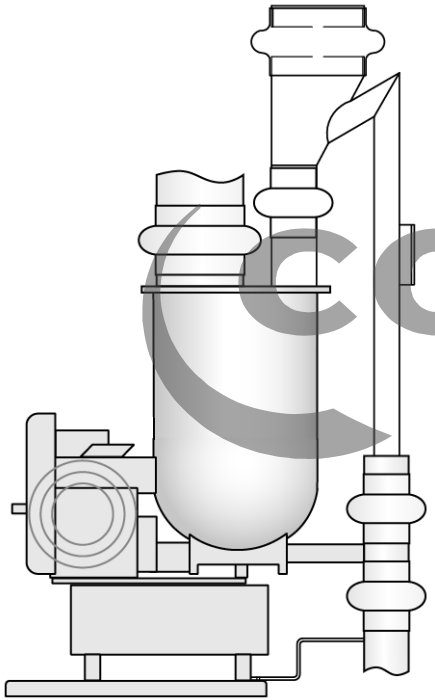


Pressure Compensation



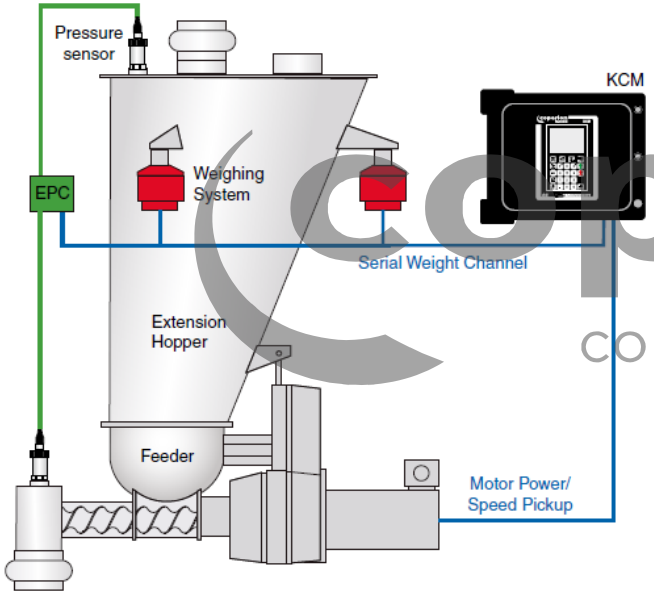
- Pressure and Vacuum within the feed system cannot be distinguished from weight by the scale system.
- Fluctuations in pressures can sometimes be dramatic and induce massflow variations.
- Can be caused by clogged vent filters preventing air from displacing during refill.

Pressure Compensation – Traditional Solution



- Traditional mechanical solutions involving matching the surface areas – and therefore the forces – acting in opposing directions due to pressure.
- Expensive to fabricate and cumbersome to install.
- Availability of components such as caps, clamps, and flexes limit selections and usually make compensation imperfect.

Pressure Compensation – Modern Solution



- Adding pressure sensors into the control loop allows the controller to compensate for the effects of even varying pressure.
- Substantially simpler for systems that must be completely sealed or nitrogen purged.


Thank you very much
for your attention!
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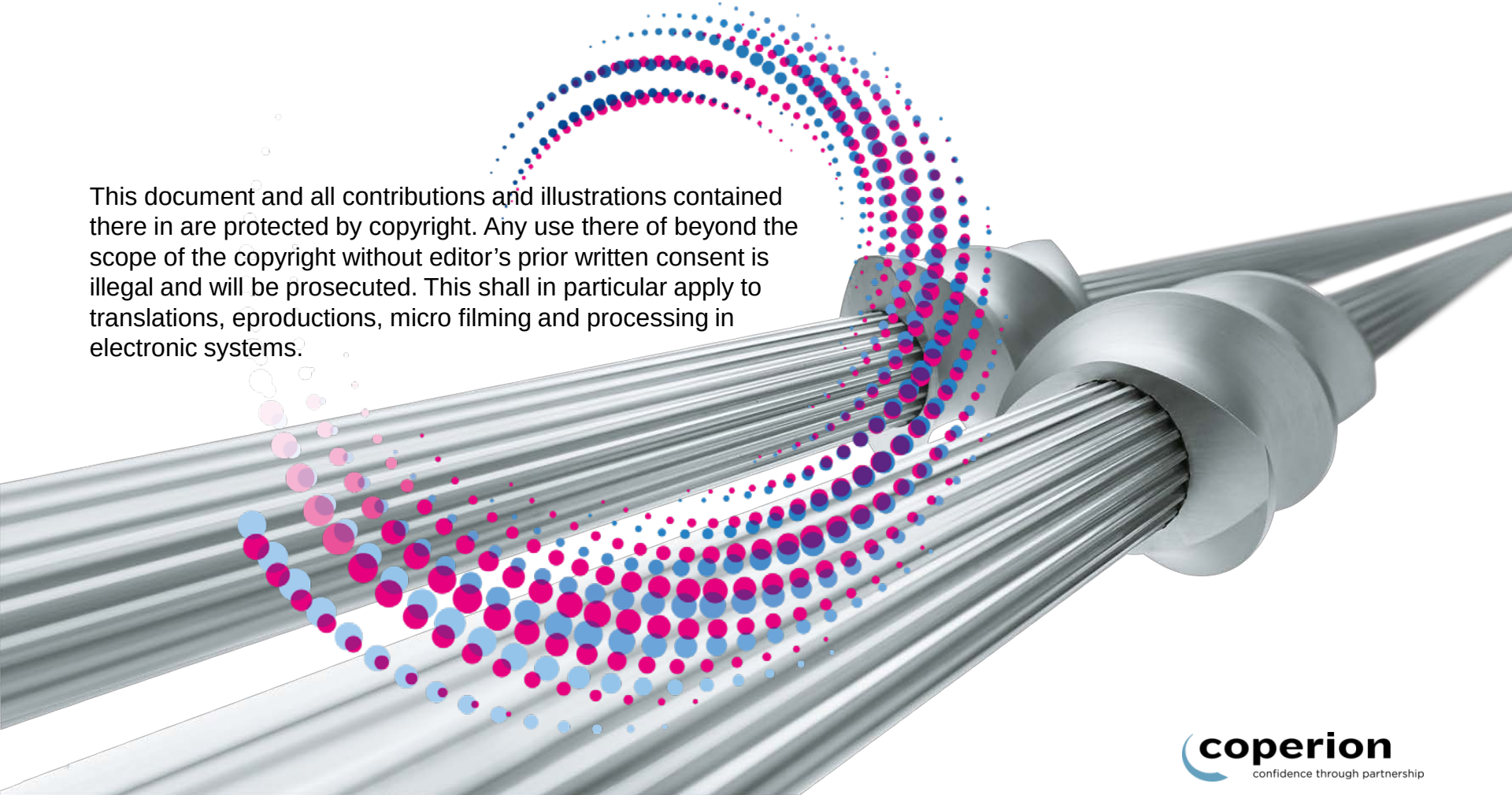

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