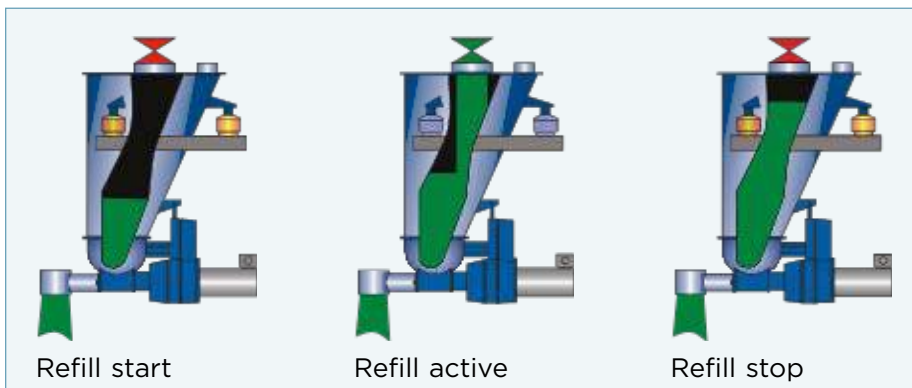
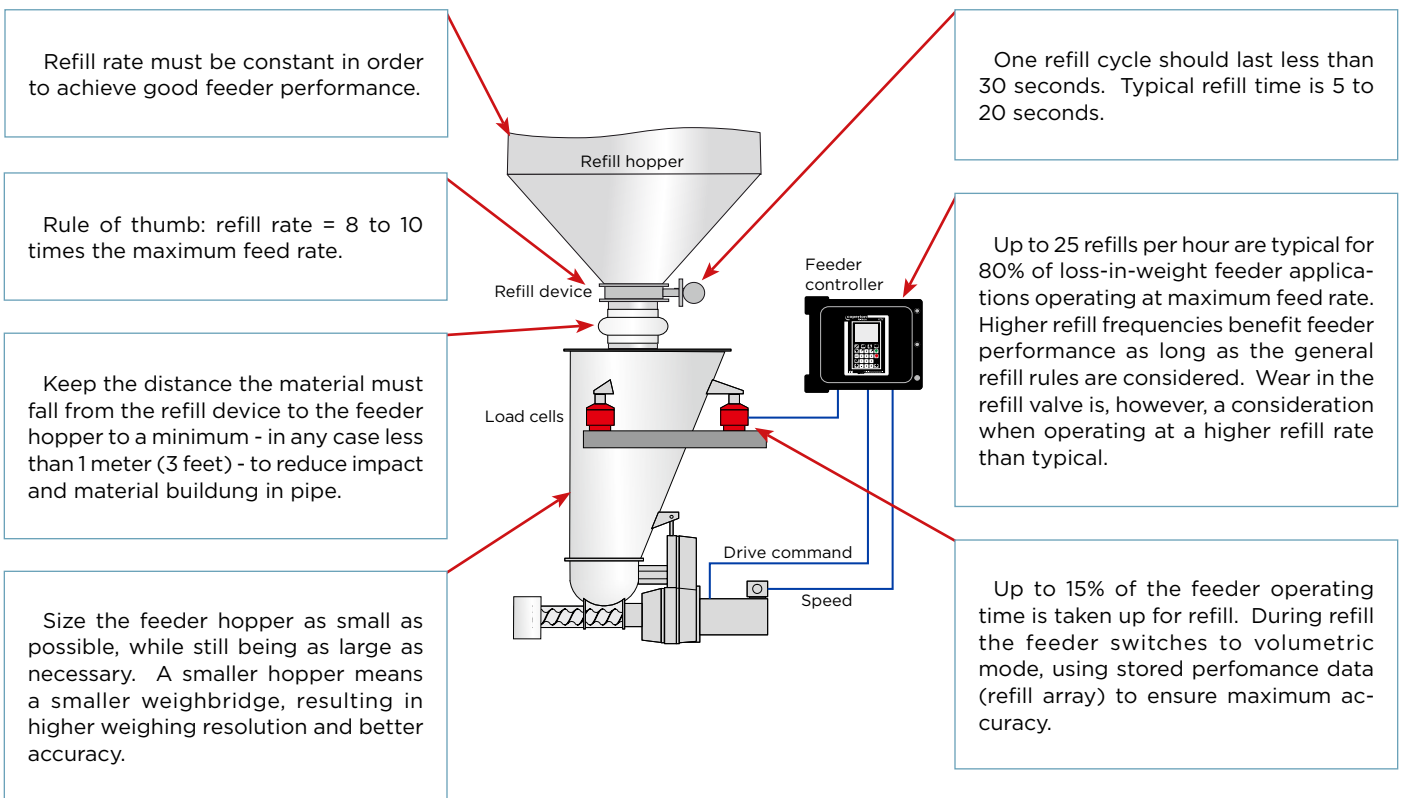


Area of Application

This guideline applies to Coperion K-Tron loss-in-weight feeders equipped with KCM control modules and K-SFT Smart Force Transducer type load cells or scales. The aim of this guideline is to ensure a smooth loss-in-weight feeder refill required for high accuracy feeding performance. In addition, the guideline provides individual advice for weigh hopper size and refill device selection depending on the material characteristics.

General Refill Rules



Feeder Hopper Size

The percentage of the feeder hopper volume which can be used for refill depends on the material flow characteristics of each bulk material. Free flowing materials such as evenly shaped pellets allow for a very small material column above the feeding device and do not cause issues such as compaction, flooding or changes in bulk density which may influence the feeding accuracy. Materials with less predictable characteristics such as powders generally do not have a consistent bulk density (e.g. settled vs. loose state) and require a higher material buffer above the feeding device in order to reduce the impact on feeding accuracy during refill. In order to select the most appropriate feeder hopper size for optimal refill based on bulk material characteristics we recommend the following:

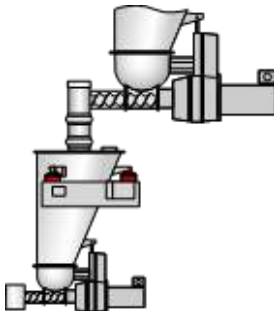


- For lens- or cylinder-shaped plastic pellets with a size of approx. 2 to 3 mm > up to 70% of feeder hopper volume.

- For free flowing and coarse materials like sugar crystals, salt or semolina > up to 50 to 70% of feeder hopper volume.
- For coarse powders with minimal tendency to fluidize or compact such as milk powder, flour or calcium carbonate > up to 50% of feeder hopper volume. *Actiflow or vertical agitation might be required depending on the tendency to compact.*
- For fine and light powders which are easy to fluidize like starch or talc > up to 30% of feeder hopper volume. *Vertical agitation or ActiFlow might be required to overcome bridging effects when material deaerates while resting in the hopper.*
- For fine and heavy powders with the tendency to compact such as titanium dioxide, barium sulfate > 30 to 50% of the feeder hopper volume. *Most of these heavy powders require vertical agitation to maintain constant material flow and screw fill.*

Many bulk materials such as powders or irregularly shaped regrind or recycled materials are difficult to categorize and we recommend the benefits of bench testing in order to pre-select the right material category. Bench tests provide information about bulk density change, flow angles, tendency to fluidize or compact, particle size distribution and shape.

Note: The values stated here are general guidelines and might vary due to actual refill settings. The individual setting is dependent on material characteristics, height of refill pipe, material flow out of supply hopper and open/close time of the refill valve. Specific refill settings will be defined as part of a feeding accuracy test or loss-in-weight feeder start-up.

Refill Device Selection

Criteria	 Screw Feeder	 Rotary Valve	 Butterfly Valve or Slide Gate
Material flow	Volumetric; controlled independently from hopper fill level	Volumetric; controlled independently from hopper fill level	Gravity flow; dependent on hopper fill level
Single refill buffer in combination with vacuum receiver	May be necessary for very difficult to handle materials	Necessary as an explosion barrier if receiver is equipped with explosion venting	Ideal for all kind of pellets and powders allowing for high refill rates
Multiple refill buffer hoppers and silos	Ideal for powders to control refill rate	Ideal for powders to control refill rate	Ideal for pellets, critical for powders due to gravity flow issues
Dust explosion barrier	Not suitable	Recommended	Not suitable
Wear	No major concern	No major concern	Concern when closing against material flow

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