



RECOMMENDED HOPPER DESIGN

IMPORTANCE OF HOPPER DESIGN

Proper hopper design plays an important role in obtaining the rated capacity of a feeder. These recommendations are intended solely to provide general guidelines to the hopper designer from the perspective of obtaining proper flow from the hopper transition section to the feeder. It is the responsibility of the designer to determine exact hopper dimensions, also taking into account variables such as material flow characteristics, propensity to adhere to surfaces, size, and size distribution.

Proper transition section design is also critical to controlling the material “headload” on the feeder, and avoiding resulting damage to the feeder in some instances.

RECOMMENDED HOPPER CONFIGURATION

For efficient material flow from the hopper, some general rules should be followed. The **rear wall** should be at a slope of approximately 60° to ensure flow of material from the rear of the hopper. The slope of the **front wall** of the hopper should be 5-10° less than that of the rear wall, or 50-55°.

HOPPER DIMENSIONS

Generally speaking, the **gate height** (H) should be a minimum of twice the largest particle size, for material with normal size distribution.

The **hopper throat** dimension (T) should be approximately 1/2 the gate height (H). If this throat dimension is increased dramatically, the material flow patterns distort and feed rate is significantly reduced. This may also create an excessive

“headload” of material to the hopper, that can overpower the ability of the feeder to convey material, and cause feeder damage.

The **hopper width** dimension should be essentially the same as the inside width of the feeder deck, allowing for clearance on each side of approximately 1/2". It should also be a minimum of 2.5 times the largest particle size for random size material, and 5 times the largest particle size for near size particles.

An adjustable gate is recommended to provide an additional measure of flow control, and is also useful to clear the feeder deck of material for routine maintenance.

INSTALLATION OF SKIRTING

To obtain the required capacity of some feeders, it is necessary to convey material at a depth greater than the sidewalls of the feeder deck. In such cases, skirting must be installed on both sides of the hopper, extending the length of the feeder. To prevent material from wedging between the skirting and the feeder deck, the skirts should taper slightly away from the bottom of the feeder deck as shown in the figure below. The skirting should have 1/2" clearance from each sidewall of the feeder.

FEEDER LENGTH

The feeder has to be long enough to retain material at its angle of repose (AR) on the feeder pan when the feeder is shut down. A safety factor of 6 to 12" (E) of extra length is recommended to prevent the possibility of free flow.

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