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## Calibration technique for the drum style chip thickness classifier

### Scope and significance

The drum style chip thickness classifier\* is a commonly used machine to describe the size distribution of wood chips destined for consumption in the pulp and paper industry. A wood sample of about 3 kilograms is placed inside a drum containing fixed and movable bars. The movable bars open to desired gaps dependent upon the number of revolutions a stepper motor is instructed to turn. This document describes a preferred procedure to determine the number of revolutions the stepper motor should be instructed to turn so the classifier will accurately separate wood chips at a set of defined sizes.

The objectives are:

- Identify machines that are in need of repair due to wear on drum components,
- Provide a calibration technique that can be used by various operators so they will achieve like results,
- Provide a calibration technique that can be used on various classifiers so they will achieve like results, and
- Lessen the difference seen among different classifiers that classify similar material.

In addition to calibration of the mechanical aspect of the classifier, other factors also affect accuracy and repeatability, including the timing settings (floor, slope and threshold), and the version of installed software. The objective of establishing uniformity of chip segregation among different machines may not be achieved if these factors are different among machines. This procedure is designed for use with Windows based software.

Calibration is achieved by using a set of calibration chips of defined dimensions and by adjusting the gaps between bars until the calibration chips are retained or passed through the bar gaps at defined success rate.

### Safety precautions

Make sure all safety devices such as stop switches, door open/close switches, master switches, etc. are operable. Use all appropriate safety precautions and safety procedures while performing these procedures.

Required tools:

- 1 set of calibration chips (see Appendix A)
- 1 stopwatch or similar timer
- 1 2-mm ceramic or metal thickness gauge (for use on drums 2004 or later)
- 1 1.5-mm ceramic or metal thickness gauge (for use on drums 2004 or later)
- 1 straight edge of credit card type (for use on pre 2004 drums)

## Procedure

### 1. Pre-check list

- Ensure all safety devices are operable and working correctly.
- Resolve all known mechanical issues.
- Clean the classifier unit thoroughly.
- Check the vibrating screen for burrs or obstructions that might impede chip flow.
- Check scales for accuracy, level, and operability.
- Check that classifier unit is level.

### 2. Set the Home Position

The home position should be set prior to beginning the calibration test.

*\*\*To set the home position in drums put in service during 2004 or later:*

The proper home position is determined by inserting a 2-mm thickness gauge between all bars. The 2-mm gauge should fit tightly with no movement and a 1.5-mm thickness gauge should move freely when placed between all bars. If the home position needs adjusting, manually rotate the Acme screw in the spider assembly until reaching the correct gap setting in the bars as measured by the thickness gauges, then re-position the home limit switch. This measurement will also detect bent bars that will cause inaccuracies in the calibration process. If bent bars are discovered, they should be replaced before further attempts at calibration.

*\*\*To set the home position in drums put in service prior to 2004:*

The proper home position can be determined by using a straight edge. A credit card is often used. When placing the straight edge on three bars, two stationary and one moveable, all three bars should touch the straight edge. If the center moveable bar is higher or lower than the stationary bars on either side, manually rotate the Acme screw in the spider assembly until reaching the correct gap setting in the bars as measured by the straight edge, then re-position the home limit switch.

### 3. Set the >2-mm gap series

The gaps between the moveable and fixed bars in the drum are set by adjusting the number of revolutions the stepper motor turns to achieve the desired gaps between the two sets of bars. This procedure is designed to set individually, and in sequence, the 4 mm, 6 mm, 8 mm, 10 mm and 12 mm thickness gaps.

For each thickness gap there are a set of undersized and oversized chips.

**Table 1 - Dimensions and colors of calibration chips**

| Desired<br>Thickness Gap | Undersized |           | Oversized |           |
|--------------------------|------------|-----------|-----------|-----------|
|                          | Color      | Thickness | Color     | Thickness |
| 4 mm                     | sm yellow  | 3.75 mm   | sm blue   | 4.25 mm   |
| 6 mm                     | orange     | 5.75 mm   | green     | 6.25 mm   |
| 8 mm                     | sm red     | 7.75 mm   | sm white  | 8.25 mm   |
| 10 mm                    | lg yellow  | 9.75 mm   | lg blue   | 10.25 mm  |
| 12 mm                    | lg red     | 11.75 mm  | lg white  | 12.25 mm  |