**HOW TO CALCULATE BELT CONVEYOR OVEN SIZE**

To determine if a belt conveyor oven is practical for your application, estimate the conveyor size. The heated length will only be a portion of the oven's total size. To estimate the heated length, you will need:
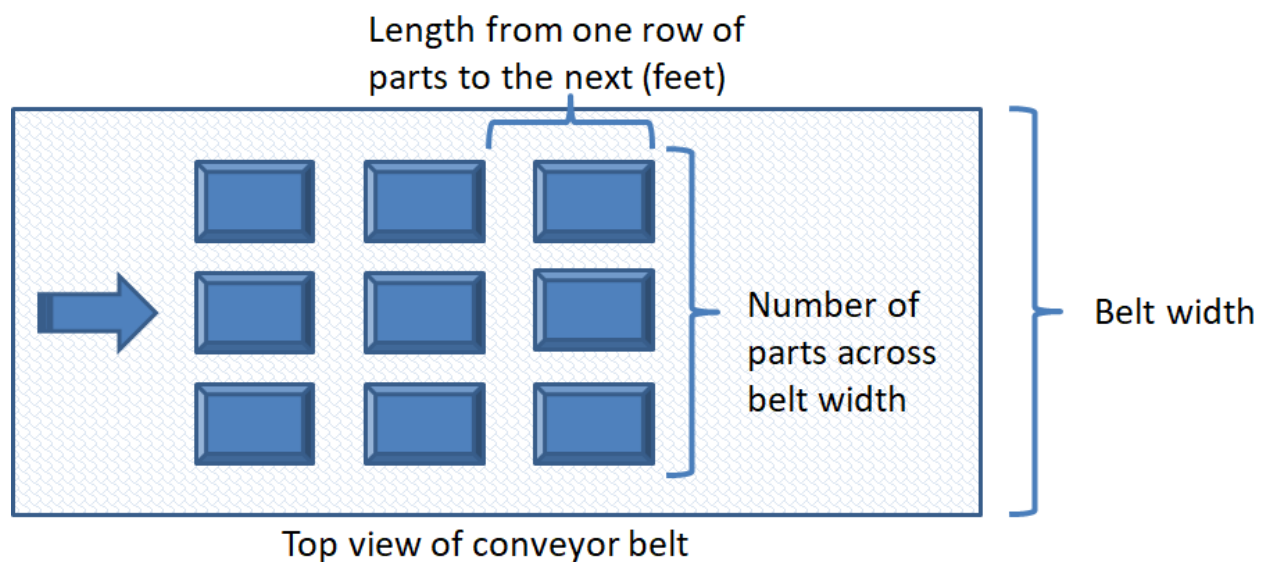
- *Loading density* –Total number of parts in distance along belt (parts/lineal foot)
- *Production rate* –Total number of parts processed in a given time period (parts/hour)
- *Dwell time* –Total length of time that parts spend in heat zone (hours)

It is important to understand the relationship between belt width, production rate and heat zone length. Doubling the belt width will double the production rate, or allow the heat zone to be half as long. Similarly, doubling the production rate will require a belt twice as wide or a heat zone twice as long. Feel free to underline contact us. Grieve directly for any specific questions related to conveyor ovens or continuous oven processing.

**Calculating Loading Density**

Loading density is the number of parts per lineal foot of belt in the direction of travel. This is impacted by a number of factors such as part size, distance between parts, and belt width.

Belt width is selected to accommodate the desired part loading orientation. Determine the number of parts you expect to fit across the width of the conveyor belt, including enough space between parts to provide adequate heated air to flow around the parts. The belt width should be reasonable, typically not much more than 4 feet. In the direction of travel, add space between rows for handling and heated airflow. For a visual description of the dimensions required, refer to the graphic below:



The loading density will be the number of parts on the belt per lineal foot divided by the number of feet between rows of parts in the direction of travel.

$$Loading\ density\ (\frac{parts}{lineal foot}) = \frac{Number\ of\ parts\ across\ belt\ width}{Length\ from\ one\ row\ of\ parts\ to\ the\ next\ (feet)}$$

**Calculating Length of Heat Zone**

The minimum required length of the heat zone is a function of the production rate, dwell time, and loading density as follows:

$$Heat\ zone\ length\ (feet) = \frac{Production\ rate\ \left(\frac{parts}{hour}\right) x\ Dwell\ time(hours)}{Loading\ density\ (\frac{parts}{lineal\ foot})}$$

To the calculated heat zone length should be added a factor of safety of at least 10% to account for lower temperature at open ends of oven. A Greater factor of safety should be used for high temperature ovens or those with a wide belt.

**Approximate Belt Conveyor Oven Size**

Equipment **width** will be approximately 3 feet wider than belt width to accommodate belt bed clearance, insulation, duct work, control enclosure, and belt drive.

The heat zone **length** will only be a portion of the oven's overall length.  The length of load and unload zone, unheated vestibules and cooling zone must be added to the calculated heat zone length.  An additional 2 feet of length should be added for the belt drive and belt guarding.

Approximate equipment **height** will be the sum of:
- the pass line (distance from the floor to the top of the belt)
- work space height (height of parts plus 6 inches, but not less than 15 inches)
- heat chamber height of 30 to 42 inches depending on blower size.

It is important to understand all requirements of the system for accurate sizing. Refer to the graphic below:

**Circulation Diagram**

Full vertical air flow forces heat down through parts loaded on belt.
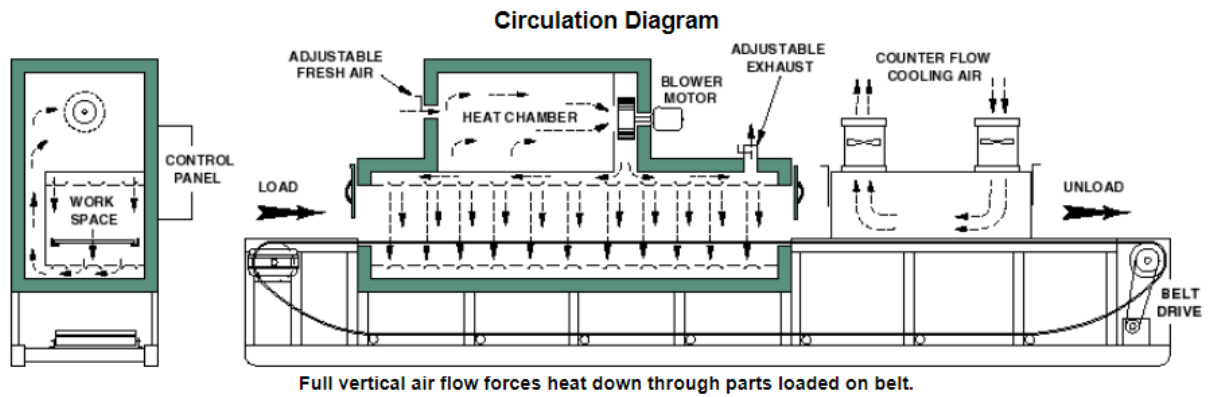
Feel free to reach out to Grieve directly for more accurate sizing and for any specific questions related to belt conveyor ovens, <u>contact us</u>.