

## HOW TO CALCULATE ROTARY HEARTH OVEN SIZE

To estimate the diameter of hearth required for your process, you will need:

- *Part dimensions* – The part footprint while being heated determines diameter of hearth
- *Production rate* – Total number of parts processed per unit of time (parts/hour)
- *Dwell time* – Total length of time that parts spend in oven (hours)

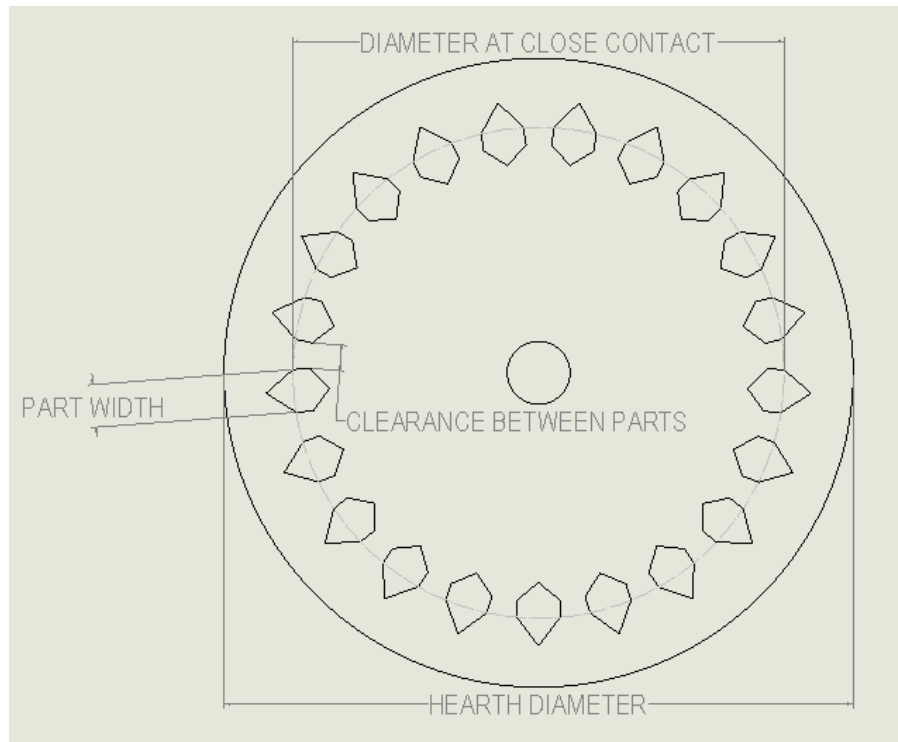
It is important to understand the relationship between the hearth diameter, production rate and dwell time. Doubling either the production rate or dwell time will require twice as many loading positions on the hearth. The loading positions on the hearth are a function of the circumference of the hearth. For this reason, doubling the number of loading positions on the hearth requires doubling the hearth diameter. Feel free [to contact us](#) directly for any specific questions related to conveyor ovens or continuous oven processing.

### Calculating Loading Positions

The number of parts that must be loaded on the hearth to maintain the design production rate is equal to the production rate (parts/hour) multiplied by the dwell time (hour):

$$\text{Parts on hearth} = \text{production rate} \left( \frac{\text{parts}}{\text{hour}} \right) \times \text{dwell time (hours)}$$

The relationship between the hearth diameter, part loading, and clearance is shown in a top view below:



The number of loading positions on the hearth is determined by the distance from the center of the hearth where parts come into close contact. The circumference at this distance from the center of the hearth divided by the width needed for each part equals the number of loading positions on the hearth:

$$\text{Loading positions on hearth} = \frac{\pi \times \text{diameter at close contact (inches)}}{\text{part width} + \text{clearance (inches)}}$$

To adjust the number of loading positions on the hearth, parts can be nested, positioned more than one row deep around perimeter of hearth, or the hearth diameter changed. A hearth diameter of greater than 60 inches is not realistic due to stability and ultimate oven size. However, more than one smaller diameter hearth can be positioned one above the other on a common shaft.

The number of load positions should be increased by a factor of safety of at least 10% to account for lower temperature at the load opening. Greater factor of safety should be added for higher temperature ovens or those with a large load opening. Any positions in an unheated vestibule will not be production positions.

### **Approximate Rotary Hearth Oven Size**

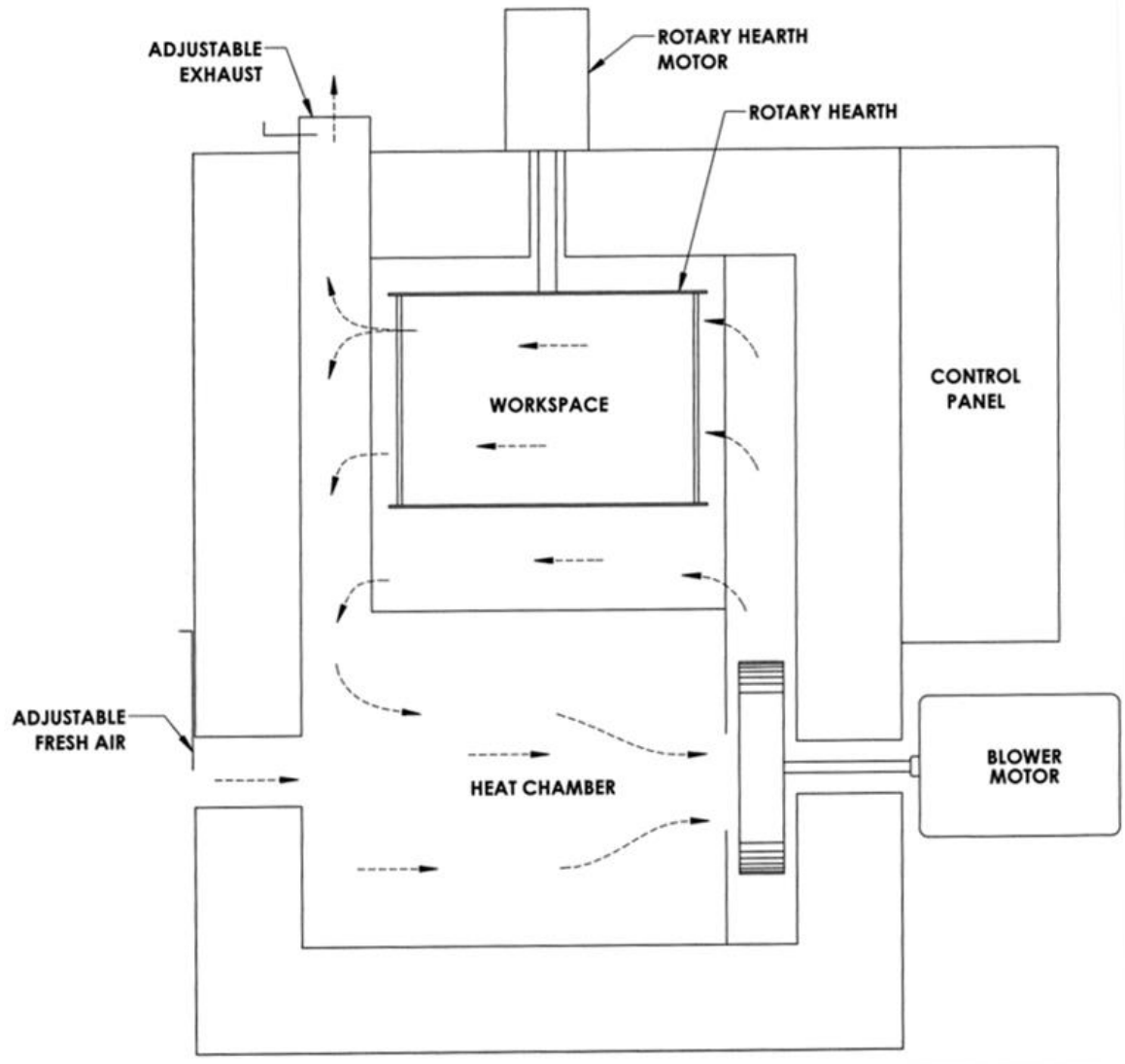
The **width** of the oven will approximately the diameter of the hearth plus 30 inches to account for clearance to the hearth, duct work and insulation thickness. In addition there will typically be a motor mount and control panel on one side of the oven adding approximately 18 inches to the overall oven width.

Similarly, the **depth** of the oven will be approximately the diameter of the hearth plus 2 inches to account for clearance to the hearth, door and insulation thickness.

Approximate equipment **height** will be the sum of:

- the distance from the floor to the top of the hearth
- work space height or part height plus 6 inch clearances (but not less than 15 inches total)
- ceiling insulation thickness (typically 6 inches)
- approximately 24 inches for hearth drive on roof of oven

To help with understanding the overall size of the rotary hearth oven, refer to the graphic below:



Feel free to reach out to Grieve directly for more accurate sizing and any specific questions related to rotary hearth ovens [contact us](#).