

Damper Control

Fresh air and exhaust dampers control the amount of air exchanged as well as the oven chamber pressure. When the fresh air damper is closed and the exhaust damper is open, oven chamber pressure tends toward negative. When the fresh air damper is open and the exhaust damper is closed, the oven chamber pressure tends toward positive.

A negative oven pressure may draw ambient air into any opening, causing cool spots to occur. The slightly pressurized chamber produces the effect of pushing air to the corners of the chamber. However, too much positive pressure may force hot air or process vapors out of any openings in the oven into the work area. Ideally, the fresh air and exhaust dampers should be closed as much as possible and the oven should be maintained at a neutral or slightly positive pressure.

Determining Damper Settings

The optimum setting for the amount of fresh air that should be distributed into the chamber depends on several factors. These factors include ambient environment temperature, load conditions, load distribution, heat-up rates, cool-down rates, desired temperature uniformity and, most importantly, the desired operating temperature. Carefully consider existing engineering tradeoffs while using guidelines to determine the fresh air damper setting.

Fresh Air Damper Fully Closed Position

The chamber achieves maximum attainable heat-up rates when the fresh air damper lies in the full closed position. With the damper in the full closed position, the chamber will operate at the desired temperature using the minimum amount of power. In most cases, the oven also efficiently operates at the chamber's maximum operating temperature when in the full closed position.

Fresh Air Damper Fully Open Position

The chamber operates at its minimum operating temperature with the fresh air damper in full open position.

Friction heat from the air recirculation system builds up in the chamber. This causes chamber temperature to rise slightly even without the heating system on. The chamber reaches thermal equilibrium temperature after the recirculation motor runs for an extended period of time.

The chamber cannot readily dissipate heat generated by friction without a fully open fresh air damper. With the fresh air damper fully open, the thermal equilibrium temperature is the minimum operating temperature of the chamber.



When the damper is in full open position, the oven may not be able to heat to the maximum oven operating temperature.

In general, the damper should be set so that the amount of fresh air flowing into the chamber agrees with the desired operating temperature conditions.

Exhaust Damper Control

Adjusting the exhaust damper aids in chamber pressure adjustment and affects the amount of fresh air entering the chamber.

Table 1. Damper Positions for Chamber Pressure.

Damper	Position	
Fresh Air	Open	Closed
Exhaust	Closed	Open
Chamber Pressure	Positive	Negative



Warning!

Maintain slight positive pressure to regulate heat.

Too much positive pressure in an oven can create a high outer skin temperature as hot air is forced out through panel joints and around door seal. High outer skin temperature could warp the front of the oven.

Some ovens have stops or minimum settings for the fresh air and exhaust dampers. These minimum settings are typically on class A ovens. See link below for more information on class A ovens.

[Understanding Class A Ovens](#)



Warning!

Do not block fresh air or exhaust openings or bypass minimum damper settings.

Reducing fresh air and exhaust flow below the design minimum could result in dangerous operating conditions.