

Circulation Heaters for Vegetable Oil Heating in a Food Processing Plant

Viscosity plays an important role in the food processing industry. The texture of many liquids depend on the viscosity. The food manufacturing plant must employ sophisticated techniques to maintain the correct amount of viscosity so that liquids flow within the piping and containers efficiently and according to manufacturing specifications to minimize maintenance downtime and efficient processing.

WATTCO brings to the market a wide range of circulation heaters for the food manufacturing industry (see Figure 1). In food processing applications, WATTCO circulation heaters are used to heat up vegetable oils so proper viscosity is maintained during food manufacturing.

Circulation heaters heat the fluid—in particular, the vegetable oil—using indirect heating. A circulation heater is a cylindrically shaped tank which is fitted with nozzles at both ends. The main structure is metallic, primarily steel, but insulated to preserve heating. Inside the tank, usually a WATTCO flange heater is used. The circulation heater also has temperature monitoring and control and is equipped with a thermostat. Circulation heaters are capable of heating the fluid when the fluid travels across the length of the tank. The vegetable oil enters and exits the circulation heater using the inlet and outlet nozzle.

WATTCO recommends circulation heaters with low watt density to maintain correct viscosity for food manufacturing applications. Depending on the requirement, the user can choose appropriate flange material along with wattage and power ratings in kilowatts.

The heating element and the sheath are the main components for keeping the vegetable oil adjusted to the correct temperature. They are also responsible for maintaining the correct viscosity.

Applications	Sheath	Flange
Heating of vegetable oil	Steel	Steel or Stainless Steel

Viscosity is measured using a Saybolt Universal viscometer. It is an instrument that measures the fluid's flow over a specified time at a certain temperature (100 degree F). For example, 120 SSU of viscosity implies a flow of a fluid sample passing in 120 seconds.

For temperature measurement and control of a circulation heater, a technician should use the thermocouple probes or thermostats for the required temperature along with over-temperature protection for the safety of the food manufacturing plant. Usually, thermo couples are placed on top of the outlet nozzle for such control. Note that temperature control is directly related to controlling the viscosity.

[How to select a proper circulation heater](#)

For vegetable oil application, the technician should select a circulation heater and vessel design, depending on two factors:

- vegetable oil flow rate
- electrical characteristics of the heating elements (i.e., low watt/area specification)

In addition, the technician must choose the appropriate mounting type: horizontal or vertical. The choice depends largely on the floor space available.

Advantages of using a circulation heater for heating vegetable oil

- Circulation heaters are capable of heating vegetable oil very efficiently.
- Circulation heaters facilitate easy maintenance including replacing heating elements easily.
- No specialized terminal box is necessary. In most cases, a basic terminal box is sufficient.

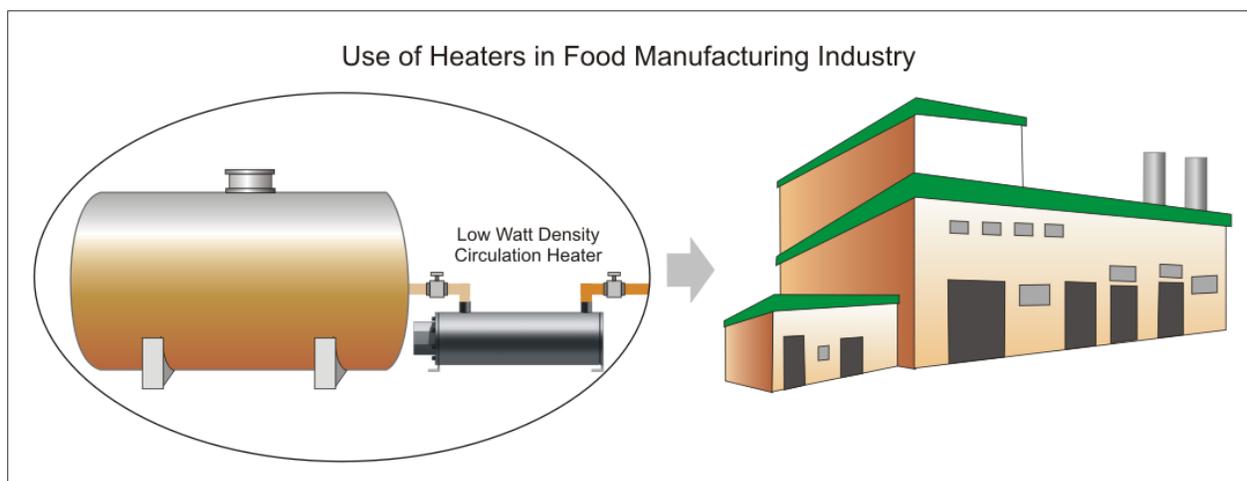


Figure 1