



## Application Notes

### Moisture & Oil in Potato Chips

Moisture Measurement and Control is extremely important in the production of potato chips. Not only does it impact the taste, but also the texture and shelf-life.

Oil measurement is required for labeling and is needed to ensure consistency in the flavor of the chips, and provides important process information concerning the replacement of slicing knives.

Both measurements can be made off-line, but on-line measurement is advantageous as feedback is more immediate. The moisture measurement can be used in an automatic control loop by interfacing with SCADA systems.

### Chip Manufacturing Process

Potatoes are peeled, sliced and de-starched prior to Frying and Seasoning. Measurements of oil and moisture are typically made shortly after the exit of the Fryer and after the Seasoning Cylinders prior to packaging. Moisture measurement at the exit of the Fryer can be used in closed loop control of the Fryer to optimize % moisture. This results in greater product consistency, longer shelf-life and less waste material.

### Gauge Installation

Gauges are typically installed after the Fryer over the Vibrating Conveyor, and prior to packaging at the exit of the Seasoning Drum. Post Fryer, the gauge should be positioned a minimum of 1 meter from the exit, in order to allow a degree of equilibration to occur, and to minimize noise induced by rapid vaporization of surface moisture. If possible, the gauge should be mounted 10" above the chips, this allows for most variation in bed depth.

If using the gauge in a control loop, it is very important to ensure there is a continuous run of product beneath the gauge and of sufficient bed depth, to prevent the gauge from viewing the conveyor belt. An ideal measurement location at the exit of the seasoning drum, is on the drop from the Drum onto the Conveyor leading to the Bucket Conveyor.

The Food Grade MCT 300 is designed to meet the strict hygiene and safety requirements of a food manufacturing plant. It is electro less nickel coated and houses a Kel F or sapphire window. The MCT 300 is fitted with a sensor window air purge diffuser to provide a positive pressure thereby minimizing deposition of oil on the window.

The elevated temperatures found at the exit of the fryer require the gauge to be fitted with an air/water cooling panel and/or a Vortex Air Cooler.

## Measurement Performance

Moisture in potato chips is a very well understood and documented application. Measurement wavelengths, algorithms, and sensor optical parameters are pre-set at the PSC factory. Gauges are Pre-calibrated on actual product to facilitate “start-up”.

| Measurement | Location            | Range % | Typical Accuracy % |
|-------------|---------------------|---------|--------------------|
| Moisture    | Exit Fryer          | 0-5     | +/- 0.15%          |
|             | Exit seasoning drum | 0-2.5%  | +/- 0.15%          |
| Oil         | Exit Fryer          | 20-40%  | +/- 0.5%           |