

## Potato Chip Moisture, Oil and Color Measurements

Potato chips and other snack foods are often cooked in deep fat fryers and packaged for long shelf life. The hot cooking oil replaces the free moisture in the chips as they cook. Fat frying is usually done in either a continuous process or in a batch kettle. Corn, multigrain chips and vegetables are fried in a process similar to the potato chip frying process. Tortilla chips include a toasting operation not required in the potato chip process.

### Potato Preparation

Foreign debris, decaying potatoes and dirt are removed in the first stage of the process. The potatoes are then washed with an abrasive process, though lye or steam are sometimes used to peel and wash. High pressure water slicers cut the potatoes into the desired thickness and remove starch from the slices. Surface moisture is removed by a variety of methods such as compressed air, rotating drum, or heated air to prepare for the frying unit operation.

### Frying Unit Operation

The chips are fried either in a batch process where they are cooked in a kettle for a period of time and removed or in a continuous process in which they move through the fryer on a mesh belt. Each manufacturer has their preferred oil for desired taste and temperature including corn, peanut, cottonseed, soy bean and canola oils.

### Seasoning Operation

Chips can be seasoned for flavor with a number of options including oil and emulsion sprays, solids coating and others prior to the weigh station. The seasoning operation includes a rotary cylinder/drum or vibrating conveyor process to ensure proper mixing of the seasoning. The chips are then packaged for shipment.

### Important Measurements – Moisture, Oil and Color

**Moisture Measurements:** Potato Chip Moisture is usually between 1.5 and 3.5% moisture depending on chip thickness and potato type at the fryer exit. While both moisture and oil are both measured at the fryer exit, the moisture measurement is used for control. The oil content is dependent upon the moisture displacement in the process. The Near Infrared (NIR) transmitter is mounted a few feet from the exit to allow the steam oil emulsion volatiles to be driven off and within 8 to 14" of the product.

Chip Moisture is also measured at the seasoning cylinder/drum exit prior to final packaging to insure flavor, freshness and shelf life.

**Oil Measurements:** Oil Content is measured with the same NIR transmitter that measures moisture at the fryer exit. Oil Content is usually between 25 and 35% oil and impacts flavor.

**Color Measurement:** Color measurements are important for regional preferences. The northeast US typically prefers darker chips, while the west coast of the US prefers lighter chips. Each geographical region has its own preferences and the color is typically measured at the fryer exit prior to seasoning, though sometimes it's measured at the seasoning exit as a measurement of final product color. Generally, only the L axis (Light to Dark) of the L, a, b color scale is used in the process.

### Measurement Transmitters

Process Sensors [MCT330-SF](#) and [MCT-MultiPlex](#) are the most common NIR and Color transmitters found in the snack food industry. Both offer reliable and accurate measurements with analog and digital outputs. The MCT330-SF NIR analyzer measures moisture and oil, and it's designed for high temperature wash down environments. The MCT-MultiPlex measures moisture and oil with NIR and measures L, a, b colors with a white light source. The [MCT660](#) Bench Top Analyzer will measure moisture and oil in the laboratory or at-line.

Please contact [Process Sensors](#) today at 508.473-9901 to discuss your application today.

