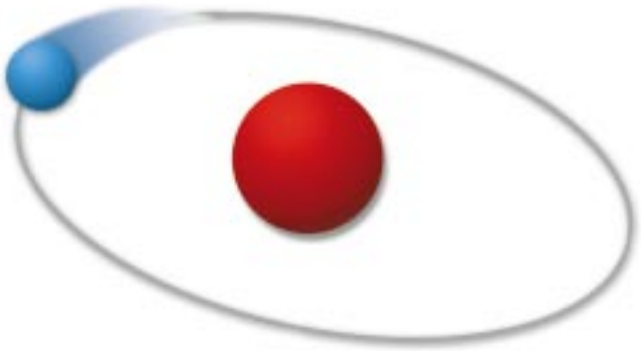
SMART Trac



Analyze.....

Cheese

Ice Cream

Sour Cream

Yogurt

Butter

Margarine

Deboned Poultry

Beef

Condiments

Cookies

Crackers

Snack Foods

and more.....

Rapid Fat Analysis System

Fast, Accurate Fat & Moisture Analysis

SMART Trac™ partners high performance NMR technology with the reliable drying capability and the versatile analytical software of the SMART System^5 to create a moisture and fat analyzer designed to yield fast, accurate results without solvents or calibration.

- Determine free and chemically bound fat
- No solvent
- No calibration
- Easy-to-use
- Accurate results in minutes!

SMART Trac NMR

Fat analysis has never been faster or easier! NMR is a rapid, non-destructive method, which does not require the use of solvents or calibration. It directly measures fat content utilizing a signal-to-mass ratio. Unlike indirect methods, which only measure the fat on the surface of a sample, NMR measures fat throughout the sample, yielding an accurate analysis that is not dependent on sample uniformity and not affected by changes in color or texture.

SMART System^5 Moisture/Solids Analyzer

The SMART System^5 provides rapid, accurate moisture/solids analysis for a broad range of products. The temperature feedback control ensures that all moisture is completely removed and the sample temperature will never exceed the user-defined temperature setpoint. The built-in power control monitors incoming line voltage and adjusts the microwave power output to normalize line fluctuations for consistent, dependable results unit-to-unit and site-to-site.

Processing Samples Has Never Been Easier!

Samples may be quickly and easily processed with the SMART Trac System. The sample is dried in the SMART System^5, then rolled in CEM's Trac Film* and placed in the NMR. It is pulsed with radio frequency (RF) energy while within a static magnetic field. The resulting signal is recorded and analyzed for the total proton activity of fat present in the sample. The SMART System's proprietary software analyzes the NMR data and yields accurate moisture and fat results.

Dry sample in the SMART System^5.

Roll dried sample in Trac Film*.

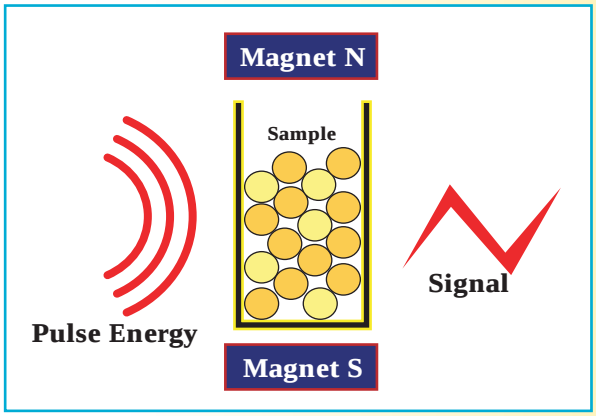
Insert sample into NMR chamber for analysis.

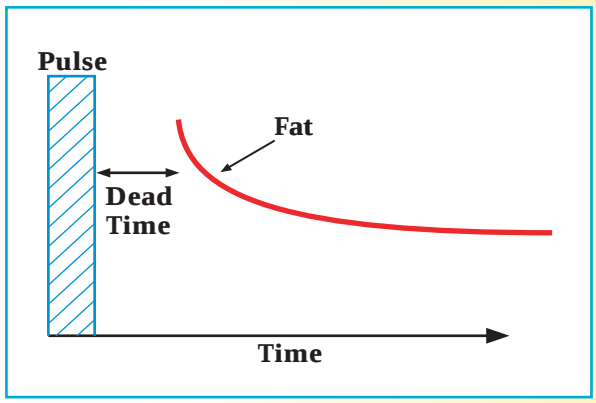
* Patent Pending

What is NMR & How does it work?

Nuclear Magnetic Resonance (NMR) is the same technique as Magnetic Resonance Imaging (MRI), which has been widely used in the medical profession for years to accurately image the human body. In addition, many industries quantify oils, fats and/or moisture with NMR.

Traditionally, NMR has not been used for wet samples because water protons interfere with the measurement of fat protons. By combining microwave drying with NMR, the technology can now be used to accurately measure fat content in almost any type of food product. A liquid or solid sample is dried to remove any hydrogen bound in the sample as water. The NMR sends a pulse of radio-frequency energy through the sample, which causes the remaining hydrogen to generate a signal, known as Free Induction Decay (FID). The intensity of the FID can then be analyzed to determine the amount of fat protons present in the sample. Because fat protons decay more slowly than the other constituents in food (e.g. protein and carbohydrates), they can easily be directly measured. In addition, NMR measures fat protons throughout the entire sample and is not affected by surface characteristics (color, ice crystals, sample changes, etc.) which create problems for some techniques.





The word "nuclear" in the name of the technique refers to the instrument's ability to analyze the nuclei of the sample. NMR technology does not generate or use ionizing radiation.

Rapid Moisture/Fat Analysis

Sample	Time	SMART Trac Value (%) (Avg.)	Reference (%) (Avg.)	Range (*)
Nacho Cheese	3:30	14.15	14.1	0.25
Ground Beef	4:15	26.70	26.72	0.34
Chocolate Ice Cream	3:30	9.37	9.40	0.09
Mayonnaise	3:15	79.48	79.46	0.23
Processed Cheese	3:45	26.45	26.54	0.25
Milk	3:30	3.18	3.18	0.04

(* over 10 samples)

SMART Trac

Rapid Fat Analysis System

A built-in power control system adjusts microwave energy delivery based on incoming line voltage*

Intelli-Temp™ temperature feedback system allows rapid temperature measurement of the sample during the drying process to adjust microwave power delivery*

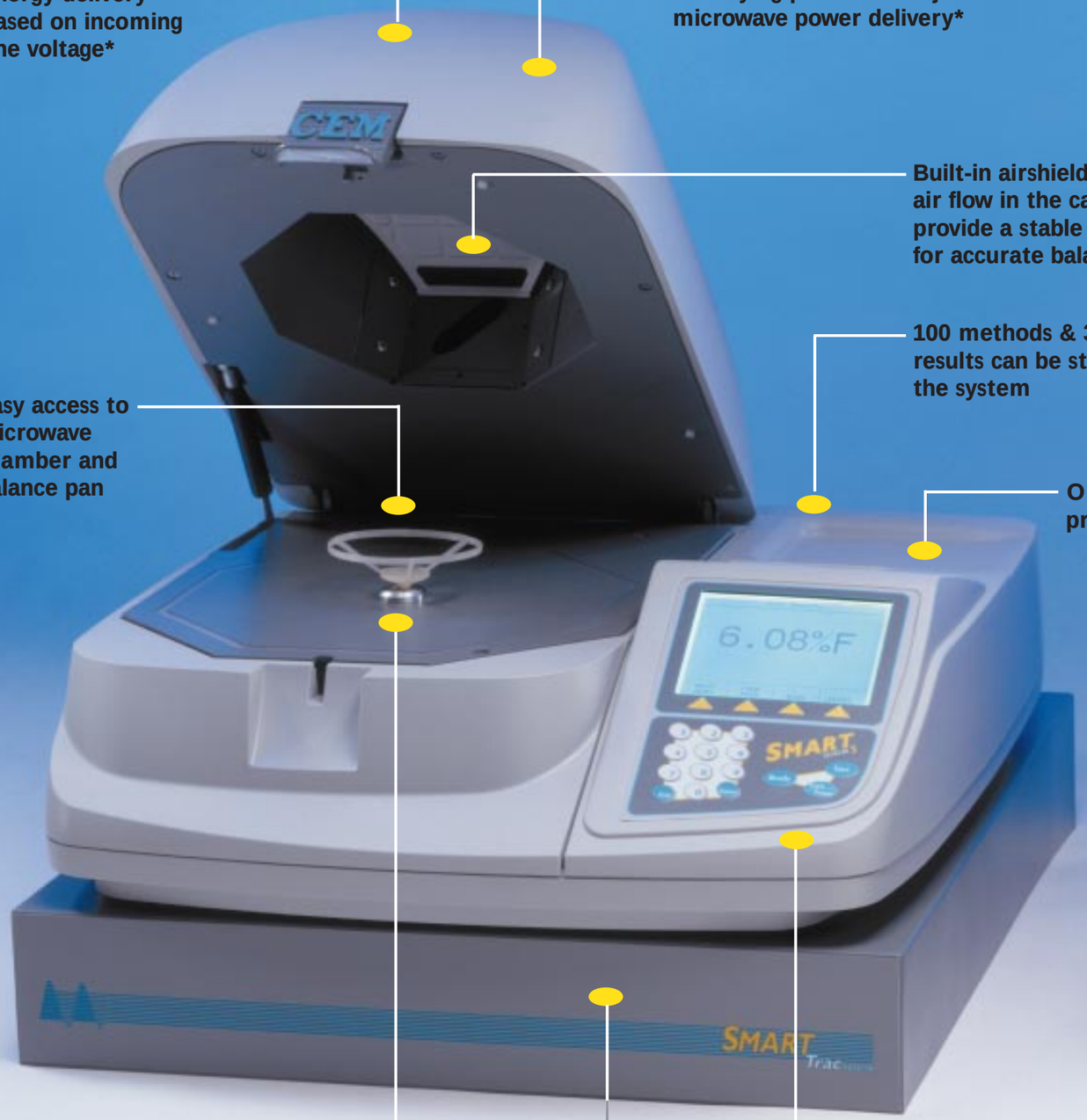
Built-in airshield controls air flow in the cavity to provide a stable environment for accurate balance readings*

100 methods & 300 test results can be stored in the system

Easy access to microwave chamber and balance pan

On-board printer

No Solvents!
No Calibration!
Results in Minutes!



Initial weight stored automatically by a built-in balance that continuously weighs the sample during the drying process*

Test precision to 0.01%

Programming in 5 languages (English, French, Spanish, Italian & German)

* Worldwide Patents Pending on the SMART Trac System and Trac Film.

System Specifications

Moisture/Solids Range	0.01% to 99.99% in liquids, solids and slurries. 0.01% resolution.
Balance Capacity	50 grams, 0.1 mg readability
Program/Data Storage	100 methods and 300 results
Standard Software	Constant weight & time, fat, moisture
Data Entry	Keypad with menu-driven software
Display	Black and white VGA (320 x 240)
Accessory Ports	2 serial, RS 232, 9 pin ports for external balance, computer or bar code reader 1 parallel port, 25 pin for external printer
Standard Printer	Internal impact printer
Interfaces	RS232
Instrument Dimensions:	
Analyzer & Processor	22.125 in (w) x 25.08 in (d) x 18.71 in (h) 56.20 cm (w) x 63.70 cm (d) x 45.31 cm (h)
Magnet	21 in (w) x 21 in (d) x 11 in (h) 54 cm (w) x 54 cm (d) x 28 cm (h)
Weight:	
Analyzer	55 lbs (25 kg)
Magnet	200 lbs (89kg)
RF Pulse Generator:	Pulse power 250W nominal Pulse times variable in 100ns increments Transmit and receive phases selectable 0, 90, 180 & 270˚ Nominal 90˚ pulse times 2us (10mm probe) and 4us (18mm probe)
Magnet:	Permanent, thermally stabilized, 0.47T (20MHz proton) Homogenity better than 10ppm
Signal Detection:	Dual channel (quadrature) detection with programmable low-pass filtering Programmable data acquisition rate up to 5MHz per pair of points

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