1 Weigh the sample.

2 Roll the sample and place it in a Trac Tube.

3 Insert into the NMR chamber for analysis.

Precise results in 2 minutes.

FAST Trac
*Fast, Accurate Moisture & Fat Analysis
for Low-Moisture Samples*

Ideal for pet foods, dairy powders, snack foods, and other dry products, CEM's new FAST Trac System makes NMR analysis of low-moisture samples faster than ever before with simultaneous fat and moisture measurements in 2 minutes or less. Designed to be robust enough to be used on the production line or in the lab, FAST Trac is a 2nd generation NMR system* (2G NMR) that utilizes many new technological breakthroughs, which allow the instrument to quickly analyze a variety of sample types. The speed of FAST Trac makes it an essential at-line analyzer, enabling companies to make ingredient adjustments in real-time and optimize least cost formulations.

- Results in 2 minutes including temperature conditioning
- Rapid sample pre-conditioning allows faster test times than previous NMR systems
- More accurate & robust than NIR
- Results comparable to standard methods
- No costly calibration maintenance
- Create new methods with only 3 samples
- Accurate results that are not affected by changes in additives, color, or granularity
- No solvents
- Intuitive, easy-to-use touch screen interface
- Easily transfer methods from unit-to-unit and site-to-site
- Save time & money by reducing out-of-specification product

FAST Trac utilizes a combination of proven sample conditioning and NMR technologies to provide unmatched performance, stability, and accuracy.

*Worldwide patent-pending

What is NMR & How Does It Work?

NMR qualifies moisture, fats, and oils in samples and eliminates the need for time-consuming extractions and solvents, long inaccurate oven drying, and chemical tests. 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 image the human body.

CEM combines a rapid preconditioning with a proprietary NMR technique to measure fat and moisture. Because of the extremely low percentage of water molecules in the sample, the NMR can accurately measure the amount of fat and moisture content in a wide variety of low moisture products, including dairy powders, snack foods, pet foods, animal feeds, and other dried products.

High Performance NMR Technology
NMR directly measures moisture and fat. Unlike indirect methods, which only measure the surface of a sample, NMR detects moisture and fat throughout the sample, yielding an accurate analysis that is independent of sample uniformity and not affected by changes in additives, color, or granularity.

Versatility
FAST Trac offers the ultimate in versatility and can be used for dairy powders, snack foods, pet food, and other dry food products. It can be used at line or in the QA/QC laboratory.

- Optimize your drying time
- Make ingredient adjustments
- Maximize least cost formulation savings
- Determine product specifications
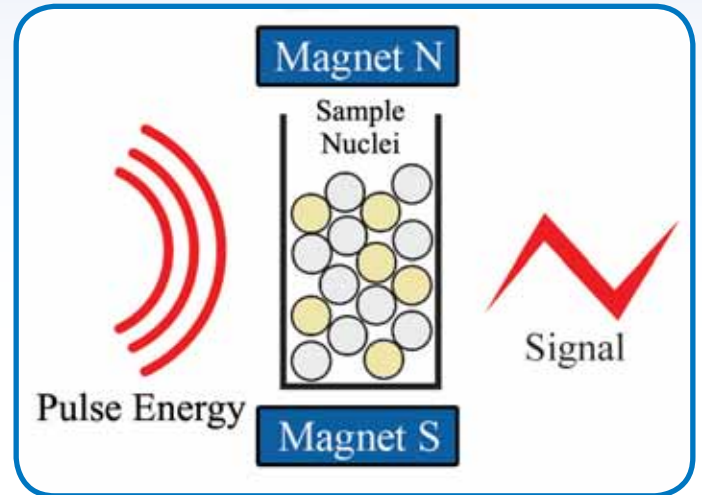
The word "nuclear" in the term refers to the instrument's ability to analyze the nuclei of the sample's atoms. NMR technology does not generate or use ionizing radiation.

Interference-Free Moisture Technology*

Traditional NMR has been used previously to measure bound moisture in dry products using the well-known Hahn-Echo pulse sequence. However, this type of analysis is difficult to use on samples with even a small fat range. This is because a partial relaxation of fat can occur during the Spin Echo, which can lead to interference with the moisture determination. Therefore, traditional NMR systems can be unreliable for moisture determination, if even a slight fat variation in analyzed samples is present.

CEM's proprietary IFM Technology™ overcomes this limitation and accurately determines moisture over a broad variation in fat content. This new technology provides assurance that you can measure moisture accurately and repeatedly over a broad range of dry product samples in only 2 minutes!

QuickPrep™ Technology*

Even though NMR is a very rapid analysis technique, sample preparation has prevented its stand-alone use where fast-paced quality control is required, as traditional NMR systems require a 20-minute temperature conditioning step to bring the sample within the NMR's optimum temperature range for analysis.

CEM has developed a novel technology called QuickPrep™ for rapidly preparing samples for NMR analysis. This new process is completely automated and is performed simply with the touch of a button in only 30 - 60 seconds.

FAST Trac vs NIR
Up to 1,000 samples for calibration or 3?

Does infrared drying not give you enough information?

Are you spending too much time trying to maintain NIR calibrations?

Need something faster and safer than Karl-Fischer with more information?

The FAST Trac eliminates all of those problem areas and more. With FAST Trac, it is possible to create a calibration with as few as 3 samples. Once created, there is no monthly maintenance required to ensure the integrity of your methods. This eliminates the need to spend time double and triple checking your NIR system.

Don't just measure the surface. Directly determine the components throughout your entire sample.

Accurately determine the moisture and fat content of your sample in just 2 minutes.

Test with confidence, knowing you have the accurate and precise value every time.

FAST Trac Vs. Other Rapid Techniques

	FAST Trac 2nd Generation NMR	NIR	1st Generation NMR
Test Time	2 minutes	2 minutes	20 minutes
Moisture analysis over broad fat ranges	Yes	No	No
Initial Setup (Method Development)	3 Samples	50-100 Samples	3 Samples
Calibration Maintenance	Not Necessary	Necessary[1]	Not Necessary
Use At Line	Yes	Yes	No
Bulk or Surface of Sample Measured	Bulk	Surface	Bulk

[1]Often referred to as calibration maintenance. NIR companies recommend monthly validation of every parameter of each method, resulting in costly reference method testing.

*Worldwide patents pending

How accurate are your results?

For more than 30 years, the food industry has depended on CEM systems for fast, accurate fat and moisture results that were AOAC compliant. CEM pioneered the use of NMR systems for the determination of fat content, now recognized by the AOAC as a direct measurement. We have taken that knowledge base and built it into the new FAST Trac to give you an easier-to-use, more cost-effective system for accurate sample analysis. The system's results are more accurate than NIR or any other indirect method. Additionally, the system is faster and safer than traditional laboratory techniques.
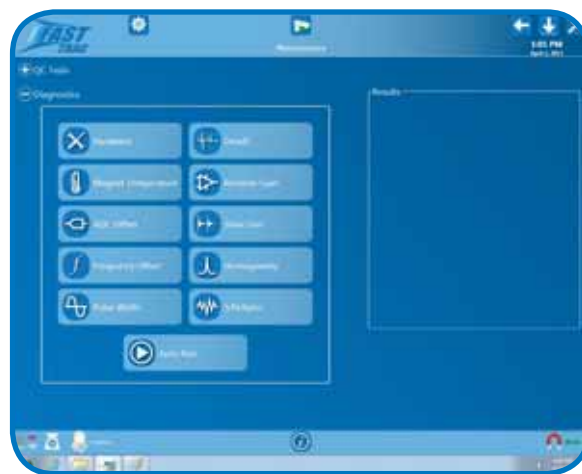
Baked and Non-Baked Chips

Moisture Method Results

Sample	Ref. Moisture %	Repeats					Average NMR Moisture %	Std. Dev.	Error %
		1	2	3	4	5			
Baked Potato Chip – Seasoning 1	1.79	1.60	1.74	1.55	1.57	1.58	1.61	0.08	0.18
Baked Potato Chip –Seasoning 2	2.57	2.18	2.27	2.33	2.35	2.37	2.30	0.08	0.27
Fried Potato Chip – Plain	2.27	2.22	2.05	1.87	1.87	2.14	2.03	0.16	0.24
Fried Potato Chip – Seasoning 1	2.45	2.26	2.36	2.42	2.39	2.46	2.38	0.08	0.08
Fried Potato Chip – Seasoning 2	2.38	2.42	2.40	2.53	2.27	2.54	2.43	0.11	0.09
Fried Tortilla Chip – Seasoning 1	1.87	2.17	2.07	2.07	2.10	2.25	2.13	0.08	0.26
Fried Tortilla Chip – Seasoning 2	1.92	1.96	2.09	2.10	2.02	2.06	2.04	0.06	0.12
								Average = 0.18	

Fat Method Results

Ref. Fat %	Repeats					Average NMR Fat %	Std. Dev.	Error %
	1	2	3	4	5			
12.47	11.75	11.47	11.98	11.96	11.68	11.77	0.21	0.70
11.11	11.28	11.17	11.06	11.17	11.04	11.14	0.10	0.08
30.67	30.18	30.53	30.78	30.06	30.20	30.35	0.30	0.36
33.70	32.63	32.75	33.61	33.52	33.13	33.13	0.44	0.57
26.40	26.89	26.87	26.81	26.99	26.79	26.87	0.08	0.47
26.15	26.40	26.42	26.33	26.54	26.01	26.34	0.20	0.24
34.71	34.23	33.83	34.94	34.20	34.24	34.29	0.40	0.51
							Average = 0.44	

Dry Pet Food

Moisture Method Results

Sample	Ref. Moisture %	Repeats					Average NMR Moisture %	Error %
		1	2	3	4	5		
Duck 1	7.24	7.28	7.33	7.37	7.26	7.34	7.32	0.08
Duck 2	6.82	7.14	7.16	7.09	7.22	7.12	7.15	0.33
Duck 3	7.09	7.18	7.21	7.20	7.19	7.12	7.18	0.09
Adult 1	6.75	6.59	6.59	6.64	6.60	6.63	6.61	0.14
Adult 2	6.90	6.34	6.56	6.64	6.58	6.60	6.54	0.36
Senior 1	6.59	6.67	6.74	6.72	6.66	6.70	6.70	0.11
Senior 2	6.42	6.51	6.61	6.19	6.37	6.46	6.43	0.01
Chicken 1	7.09	7.13	7.13	7.05	7.11	7.11	7.11	0.02
Chicken 2	6.33	6.21	6.34	6.41	6.44	6.41	6.36	0.03
								Average = 0.13

Fat Method Results

Ref. Fat %	Repeats					Average NMR Fat %	Error %
	1	2	3	4	5		
15.23	15.61	15.59	15.41	15.54	15.43	15.52	0.29
15.73	15.49	15.47	15.52	15.60	15.53	15.52	0.21
15.84	15.87	15.91	15.79	15.89	15.90	15.87	0.03
14.67	14.36	14.41	14.46	14.48	14.37	14.41	0.26
15.27	15.32	15.17	15.23	15.09	15.15	15.19	0.08
11.97	11.84	11.73	11.78	11.85	11.90	11.82	0.15
12.23	12.04	11.96	11.92	12.05	12.04	12.00	0.23
15.84	15.81	15.98	15.75	15.84	15.88	15.85	0.01
15.91	16.20	16.17	16.18	16.15	16.12	16.16	0.25
							Average = 0.17

Rapid Analysis
Moisture and Fat Determinations
in only 2 minutes

Test Precision to 0.01%

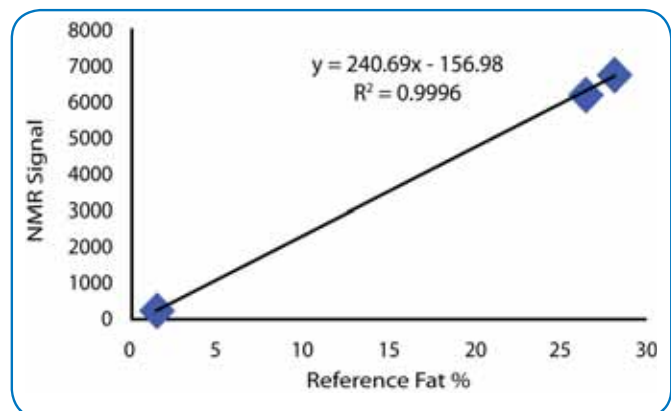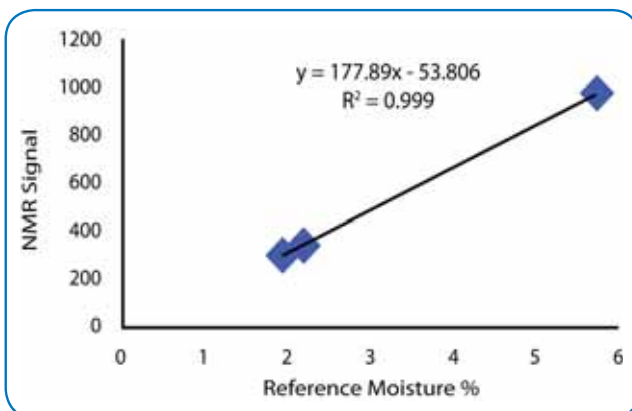**High Level of Accuracy**

Simple Touch Screen User Interface

Compact NMR
State-of-the-art neodymium magnet

Fat **2.18**
Moisture **4.93**

Infant Formula and Milk Powders
Curves generated in minutes using 3 samples

y = 177.89x - 53.806
R^2 = 0.999

NMR Signal

Reference Moisture %

y = 240.69x - 156.98
R^2 = 0.9996

NMR Signal

Reference Fat %

Touch Screen Interface

The FAST Trac can be operated using the built-in controls on a touch-screen interface. The simple interface is easy to learn and use. Follow on screeen instructions to quickly prepare a sample and place it in the FAST Trac. Moisture and Fat results are displayed at the end of the rapid test.

Easy, Reliable Sample Preparation

First generation NMR systems utilize glass tubes which can be prone to breakage. FAST Trac utilizes a proprietary, lightweight thermoplastic polymer tube that makes running samples on the system easy and ideal for many production environments, as there is no chance of breakage. This proton-free tube is specially designed to not interfere with the NMR measurement. Optimized for CEM's QuickPrep Technology, FAST Trac Tubes are ready for analysis in only 30 – 60 seconds.

SYSTEM SPECIFICATIONS

Moisture Range	Up to 12% in powders, chips, snacks, cookies and dry pet food 0.01% resolution
Fat Range	0.1% to 99.9% in powders, chips, snacks, cookies and dry pet food 0.01% resolution

Data Entry Keypad with menu-driven software

Balance Capacity	100 grams, 0.001g readability
Program/Data Storage	100 methods and 300 results
Standard Software	Software with proprietary algarithms
Display	17" Flat panel, glass capacitance touch-screen
Accessory Ports	4 USB, 1 Ethernet
Printer (optional)	External

Instrument Dimensions

FAST Trac Magnet	14 in (w) x 14 in (d) x 13 in (h) 36 cm (w) x 36 cm (d) X 33 cm (h)
FAST Trac Processor	12 in (w) x 13 in (d) x 16 in (h) 30 cm (w) x 33 cm (d) x 41 cm (h) Processor may be located up to 9'8" (3 m) away from the magnet.

Weight

FAST Trac Magnet	110 lbs (50 kg)
FAST Trac Processor	37 lbs (17 kg)
Ambient Air Temperature	Temperature must be maintained between 15 °C and 30 °C. For optimum stability and performance, the ambient temperature should not vary more than 5 °C/day.

Current

Voltage	100-240 V (50-60 Hz)
Power	800 VA maximum. UPS recommended, if power is not reliable.
FAST Trac Magnet & Processor Power Conditioner Requirements	6.3 amps (100-240 V, 50/60 Hz) 2.1 kVA 120 V, 60 Hz 1.8 kVA 240 V, 50Hz
RF Pulse Generator	Pulse Power 300 W nominal. Pulse times variable in 100 ns increments, Transmit and receive phases selectable 0°, 90°, 180° and 270°. Nominal 90° pulse imes 3 ms (10 mm probe) and 4.5 ms (18 mm probe)
Magnet	Permanent, thermally stabilized, 0.55 T (23.4 MHz proton)
Patents	6,548,303 6,548,604 7,125,721 7,220,591, Additional worldwide patents pending

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