

**STARCH ANALYSES WITH THE FLASH 2000
 COMBUSTION NITROGEN PROTEIN ANALYZER**

- **Large Sample Size Capability**
- **Inconel Crucible for Ash Removal**
- **Easy and Fast to Maintain**
- **Reliable and Reproducible Results**



Description of the Analytical Method

The Flash 2000 Nitrogen/Protein Analyzer, which is based on the dynamic flash combustion principle, requires no sample digestion or toxic chemicals, while providing important advantages in terms of time, automation, and quantitative determination of nitrogen in all sample matrices. The instrument equipped with the new MAS200R electronic autosampler provides automated, unattended analyses of up to 125 samples. Additionally, the new electronic mass flow control of both the helium carrier gas and oxygen for combustion assures the stability of the analytical conditions and eliminates the need for frequent re-calibration.

The sample is weighed into a tin capsule as received, without any pre-treatment and introduced into the combustion reactor via the MAS200R. The proper amount of oxygen, based on the weight and type of sample, is determined by OxyTune™ and introduced to insure a complete combustion of the sample.

Following combustion, the gases produced are carried by the helium flow through the reduction reactor filled with copper, then swept through CO₂ and H₂O traps, a GC separation column and finally detected by a Thermal Conductivity Detector. **The Eager Xperience dedicated software then automatically generates a complete report.**

Maintenance

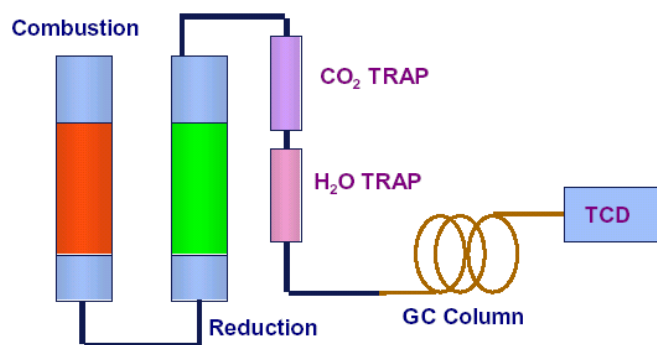
With the inconel crucible the ash removal can be performed at operating conditions (900°C), avoiding time consumed due to cooling down and heating up the reactor. We suggest removing the ash after 100-120 analyses. The crucible, cleaned after cooling, can be used again for further runs (4-5 cycles). The lifetime of the reactor tube is indefinite with the catalyst lasting from 1,000 to 2,000 analyses. Copper lasts approximately 1,000 samples with a properly optimised OxyTune™.

Analytical Conditions

Combustion temperature:	900°C
Reduction Temperature:	840° C
Oven temperature:	50°C
GC Column:	0.5M Activated Carbon
Helium flow rate:	Measurement: 140 ml/min
	Reference: 100 ml/min
Oxygen flow rate:	300 ml/min
Analytical Time:	300 Seconds
Sample Delay Time:	10 Seconds

Figure 1 – N/Protein Configuration

Analytical Layout of FlashEA™ 1112 Protein Analyzer



The design of the Flash 2000 Nitrogen/Protein Analyzer provides the capability to analyze extremely low-level starch samples. Since the TOTAL combustion gases are presented to the detector for analysis, without any manipulation of the sample, the opportunity for error is materially reduced. In addition, the gas chromatographic separation provides a display of the results. The detection capability of the analyzer is enhanced since the Eager software enables the detector gain to be run at “x10”. The sum of these and other design characteristics combine to provide improved accuracy and reproducibility for low-level starch analysis.

Typical Results

Starch	Weight (mg)	N %	Protein %	Starch	Weight (mg)	N %	Protein %
Sample A	~180	0.054	0.341	Sample G	~180	0.047	0.297
	~180	0.055	0.345		~180	0.047	0.296
	~180	0.055	0.343		~180	0.047	0.297
Average		0.055	0.343	Average		0.047	0.297
% RSD		0.45	0.53	% RSD		-0-	0.25
Sample B	~180	0.037	0.232	Sample H	~180	0.171	1.062
	~180	0.036	0.228		~180	0.170	1.059
	~180	0.037	0.231		~180	0.170	1.059
Average		0.037	0.230	Average		0.170	1.061
% RSD		0.72	0.92	% RSD		0.34	0.16
Sample D	~180	0.013	0.080	Sample J	~180	0.147	0.918
	~180	0.013	0.079		~180	0.152	0.952
	~180	0.012	0.077		~180	0.144	0.897
Average		0.013	0.079	Average		0.148	0.992
% RSD		2.38	2.30	% RSD		2.74	3.01
Sample E	~180	0.044	0.274	Sample K	~180	0.153	0.955
	~180	0.043	0.272		~180	0.148	0.926
	~180	0.044	0.275		~180	0.152	0.951
Average		0.044	0.273	Average		0.151	0.944
% RSD		0.70	0.69	% RSD		1.75	1.66
Sample F	~180	0.030	0.187	Sample L	~180	0.149	0.929
	~180	0.029	0.185		~180	0.157	0.979
	~180	0.030	0.187		~180	0.157	0.979
Average		0.030	0.186	Average		0.154	0.962
% RSD		1.55	1.55	% RSD		2.99	2.30