



BUCHI NIR Applications Milling & Bakery Industry

You need fast and reliable information about your samples in order to make far-reaching decisions. We support you in overcoming your daily challenges, from incoming goods inspection to finished product release, with more than 15 years experience supplying laboratory and at-line NIR analytical solutions for the milling and bakery industries.





NIR Pre-calibrated applications

Milling & Bakery industry

Your most important benefits

Time savings

- Shorter time to routine use. Measure parameters such as moisture, protein, ash, rheological indexes and much more from day one
- Measure all parameters simultaneously
- Control the value chain at each critical point, from incoming goods to finished product release

Reliability

- Deliver the same accuracy in production as in the laboratory
- Get accurate results from a robust spectral database spanning geographical and seasonal variations

Precision and accuracy

- Our NIR technology provides unparalleled measurement reproducibility and spectrometer performance
- Intimate knowledge and experience with reference methods like Kjeldahl, Dumas and Extraction have been implemented into the applications development

Your «NIRSolutions Laboratory»



Based on our NIRFlex® N-500 Spectrometer

- Flexible, with various measurement cells and add-ons to accommodate any sample matrix

Your «NIRSolutions At-line»



Based on our NIRMaste™ Spectrometer

- Hygienic, representative sampling
- Practical, ingress-protected design
- Simple operator interface

“Barilla Food Company has always been characterized by clear focus to quality, as demonstrated by significant investment in research and innovation. Since 2005 the company has put into action a network of Fourier Transform NIR Spectrometers for Quality Control Laboratories of its Italian bakery plants. This Barilla’s Network of FT-NIR instruments, originally used only for the analysis of chemical and rheological parameters of wheat flour by reflectance, has been recently extended to the control of other raw materials and some finished products by developing quantitative as well as qualitative screening methods.”

BARILLA G. e R. FRATELLI S.p.a.



Milling - Whole cereals

Pre-calibrated application	Wheat**	Barley**	Rice N555-519
Moisture [%]	8.2 – 22.4	11.8 – 25.9	9.0 – 15.8*
Total fat [%]			0.1 – 3.0*
Protein [%]	8.4 – 18.8	7.1 – 14.2	5.0 – 12.3*
Nitrogen in dry matter [%]		1.15 – 2.28	
Ash [%]			0.3 – 1.6*
Amylose -ISO [%]			1.9 – 27.1**
Sample compatibility	Whole kernels of hard and soft wheat	Whole barley kernels	Whole rice kernels



Milling- Ground cereals

Pre-calibrated application	Ground cereals**	Hulls & bran**
Moisture [%]	1.5 – 17.5	7.4 – 16.0
Total fat [%]	0.7 – 11.8	0.6 – 19.1
Protein [%]	5.9 – 64.4	6.5 – 41.2
Fiber [%]	0.3 – 20.4	1.3 – 29.0
Ash [%]	1.0 – 3.6	0.7 – 11.6
Starch [%]	16.8 – 76.4	14.0 – 69.0
Sample compatibility	Ground cereals like: wheat, barley, maize, triticale, sorghum, dried distillers grains	Hulls and bran like: wheat, barley, maize, triticale, sorghum; sugar beet cake

*BUCHI Pre-calibration; **Pre-calibration in development

If not indicated otherwise, the pre-calibrations listed are compatible with both the NIRFlex® Solids and the NIRMaster™ spectrometers and the samples are measured with a sample cup in diffuse reflectance mode.



Milling - Whole cereals

Pre-calibrated application	Soft wheat flour N555-515	Semolina N555-520
Moisture [%]	3.6 – 16.1*	13.1 – 16.0*
Protein [%]	6.8 – 18.8*	8.2 – 16.7*
Ash [%]	0.3 – 2.6*	0.6 – 1.0*
Wet gluten	21.6 – 48.5**	
Dry gluten		7.0 – 16.4*
W (alveograph baking strength of dough)	95 – 456**	
L (alveograph extensibility of dough)	40 – 163**	
P (alveograph maximum pressure required)	31 – 131**	
Falling number	131 – 532**	
Baking absorption	50 – 72**	
Degree of softening	5 – 147**	
Granularity	33 – 56**	
Stability	1 – 31.3**	
Damaged starch	16 – 42**	
Dough development	1.2 – 15**	
Sample compatibility	Soft wheat flour	Semolina flour



Milling - Oils seeds and meals

Product	Oil seeds and meals**
Moisture [%]	1.4 – 17.7
Total fat [%]	12.4 – 59.9
Protein [%]	14.3 – 74.4
Fiber [%]	2.4 – 30.6
Ash [%]	0.1 – 8.5
Total carbohydrates [%]	0.1 – 9.2
Starch [%]	0.1 – 28.9
FFA (free fatty acids) [%]	0.1 – 2.4
Sample compatibility	Ground oil seeds like: soybean, rapeseed, sunflower and cotton



Bakery – Fats & oils

Pre-calibrated application	Fats & oils cuvette**	Fats & oils vials**
Peroxide value	0.5 – 75.0	0.04 – 35.70
Anisidine value	0.6 – 204.0	
Polar fraction [%]	0.7 – 60.4	
Triglycerides [%]	0.2 – 33.8	
Acid number	0.1 – 8.8	
Free fatty acids [% oleic acid]		0.01 – 23.20
Iodine value		0.8 – 135.2
Sample compatibility	Mixtures of different vegetable oils and animal fats measured with quartz cuvette in transmission mode. Requires NIRFlex® Liquids measurement cell	Mixtures of different vegetable oils and animal fats measured with mono-use glass-vials in transmission mode. Requires NIRFlex® Liquids measurement cell



Bakery - Egg & milk derivatives

Pre-calibrated application	Egg powder**	Liquid egg transfectance**	Milk powder**
Moisture [%]			1.4 – 7.9
Dry matter [%]	94.3 – 96.0		
Protein [%]	40.1 – 50.7		1.7 – 91.2
Total fat [%]	36.6 – 48.5	7.9 – 11.9	0.1 – 33.0
Sterols [%]		0.35 – 0.54	
Ash [%]			2.0 – 8.5
Lactose [%]			36.5 – 55.0
pH	6.43 – 9.55		
Sample compatibility	Whole egg powder	Homogenized whole liquid egg measured with sample cup in transfectance mode	Full and skimmed milk powder, whey powder measured with sample cup in diffuse reflectance mode

* BUCHI Pre-calibration; ** Pre-calibration in development

If not indicated otherwise, the pre-calibrations listed are compatible with both the NIRFlex® Solids and the NIRMasteTM spectrometers and the samples are measured with a sample cup in diffuse reflectance mode.



Bakery products

Pre-calibrated application	Dry pasta/ noodles**	Ready-meals**
Moisture [%]	9.1 – 12.4	29.3 – 89.4
Protein [%]	12.2 – 14.7	2.1 – 24.6
Total fat [%]		0.3 – 29.1
Salt [%]		0.3 – 3.1
Ash [%]	0.58 – 1.16	0.5 – 4.2
Sample compatibility	Dry pasta/ noodles ground prior to measurement	Lasagna, meat pie, meat & fish ready-noodles, frozen pizza

BUCHI NIRsolutions are compatible with the Aunir INGOT® pre-calibrated applications like those included in the flour and milling packages.

For more information please contact your local BUCHI representative.



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**NIRFlex®
N-500**
Versatile laboratory
FT-NIR spectrometer



**NIRMasteR™
IP54**
FT-NIR spectroscopy
with ingress protection



**NIRMasteR™
Pro IP65**
FT-NIR spectroscopy
with maximum
protection



**LIMS Software
Interface**
Automated result data
management

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