NIR DA online measurement and control unit
NIR spectroscopy has been applied for many years in the grain processing industry for checking the quality of products. An increasing number of companies are now benefitting from the opportunities that this technology offers both in laboratories and online in ongoing production processes.

This is where the NIR DA online method shows its true strength: Real-time fine-tuning of processes with immediate correction of the ongoing production process.

**Advantages**

- **Real-time monitoring**
  - Immediate corrective action applied to the ongoing production process without the need to wait for laboratory values
  - Protein, ash, moisture values ... in a matter of a few seconds

- **Cost reduction**
  - Fewer laboratory tests required
  - Product recipe with lower raw material costs

- **Guaranteed product safety**
  - Absolute product consistency

- **Low maintenance**
  - Easy adjustment for recalibrations
  - Remote maintenance for optimizing calibrations

The new Buhler online systems are based on cutting-edge DA (Diode Array) technology. It is distinctly different from the older-generation filter NIR units.

**Measurement principle**

The light reflected by the sample is directed onto a detector. This diode array consists of 256 discrete detectors which simultaneously process the NIR values.

**Features of DA online technology**

- No moving parts
- 100 readings per second
- 256 NIR values simultaneously measured
- Dual-lamp technology

**Advantages offered by the Buhler DA NIR systems**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Filter NIR systems</th>
<th>DA NIR of Buhler</th>
</tr>
</thead>
<tbody>
<tr>
<td>No moving parts</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>100 readings per second</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Dual-lamp technology</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Automatic calibration</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Measurement and control in grain and flour</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Calibration for wheat</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Calibrations for rye, oats, corn/maize</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>256 measurement points for evaluation</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>
MYRF, the measurement unit for grain.
Consistent quality through online control.

The NIR DA online measurement unit of type MYRF is applied for performing continuous measurements during grain reception (intake) and processing.

**Application 1: Grading during grain reception (intake)**
Depending on the specific plant configuration, the MYRF will perform two functions:
- **Pure monitoring**
  - Continuous measurement of the raw material quality
- **Storage of the grain by protein content**
  - The grain is stored in different transfer bins on the basis of the component substances determined

**Application 2: Blending on the basis of component substances in the grain storage or the grain cleaning section**
Many businesses appreciate the optional control function in the MYRF for optimizing grain blends on the basis of the protein content or the content of other component substances.

**Advantages**
- Consistent end product quality through online control
- Quick return on investment: consistent wheat variety blends for obtaining homogeneous end products meeting customer specifications
- Statistical evaluation and product retracing
MYRB, the measurement unit for flour & semolina. Continuous quality assurance.

Quality assurance and cost optimization are daily challenges for any production manager in the grain milling industry. The MYRB supplies crucial information allowing smart and continuous control of the processes in the grinding section.

Application for flour & semolina control
The NIR DA online measurement unit MYRB determines the component substances in flour or semolina on the finished product, either after grinding or after flour blending. The optional control function ensures accurate feed of the gluten or of other component substances and thus a consistently high product quality and constancy.

Advantages
- Continuous monitoring and controlled correction increases the flour extraction rate of the entire plant
- Completely documented quality
- Process trouble (e.g. screen breakage) is immediately detected
- Statistical evaluations and product tracing
- Smart control of gluten, moisture, and ash (option)

Testing for specks
The MYRB is equipped with a digital camera capable of detecting differences in color. This allows specks and the flour color according to Minolta to be automatically measured and quantified.
DA NIR technology.
Convincing technical data.

### 1. Measurement parameters

<table>
<thead>
<tr>
<th>Sample type</th>
<th>Parameter</th>
<th>Measurement range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durum wheat</td>
<td>Protein</td>
<td>9.0 – 22.0%</td>
</tr>
<tr>
<td></td>
<td>Moisture</td>
<td>8.0 – 22.0%</td>
</tr>
<tr>
<td>Soft wheat</td>
<td>Protein</td>
<td>9.0 – 22.0%</td>
</tr>
<tr>
<td></td>
<td>Ash</td>
<td>8.0 – 22.0%</td>
</tr>
<tr>
<td>Wheat flour</td>
<td>Protein</td>
<td>10.0 – 16.0%</td>
</tr>
<tr>
<td></td>
<td>Moisture</td>
<td>8.0 – 16.0%</td>
</tr>
<tr>
<td></td>
<td>Ash</td>
<td>0.4 – 0.9%</td>
</tr>
<tr>
<td></td>
<td>Starch damage</td>
<td>3.9 – 7.5%</td>
</tr>
<tr>
<td></td>
<td>Water absorption</td>
<td>55.0 – 73.0%</td>
</tr>
<tr>
<td>Durum semolina</td>
<td>Protein</td>
<td>11.0 – 18.0%</td>
</tr>
<tr>
<td></td>
<td>Moisture</td>
<td>11.0 – 15.0%</td>
</tr>
<tr>
<td></td>
<td>Ash</td>
<td>0.6 – 1.2%</td>
</tr>
<tr>
<td></td>
<td>Specks</td>
<td>0 – 200/dm²</td>
</tr>
</tbody>
</table>

### 2. Technical data of MYRB and MYRF

- **Measurement principle**: Reflection measurement based on Diode Array online NIR
- **Wavelength range**: 900 – 1700 nm
- **Connection values**: 24 VDC/5 A for optics, 400 VAC for motor
- **Ambient conditions**: Ambient temperature: 10°C...40°C
  Air humidity: max. 80% non-condensing
- **Weight**: 160 kg MYRB, 250 kg MYRF
- **Interfaces**: User software <–> measured system: through RS-485
  WinCoS <–> measured system: through Ethernet
  Remote maintenance of optics through Internet link (VPN)
- **Supply of basic unit**: Measured system, optics, basic calibration, user software
- **Options**: Control functions

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[Images of DA online measurement unit MYRB and MYRF]