

# NIR DW-EXPEC1370

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Based on near infrared diffuse reflectance spectroscopy technology, the DW-EXPEC1370 analyzer is particularly suitable for use in laboratories of the grain and oil processing and feed industries for accurate and rapid testing of raw materials, processes and finished product quality thanks to its accuracy and speed, simultaneous detection of multi-component indicators and ease of operation.

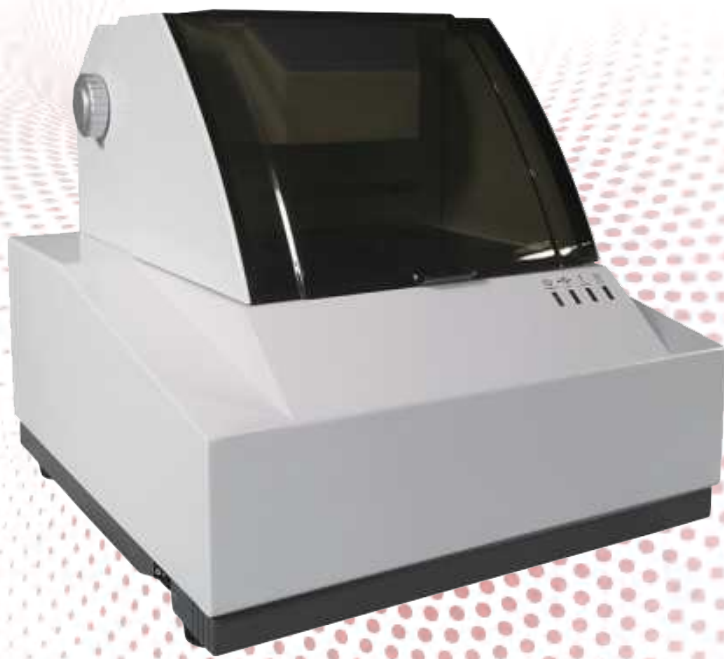
### Measuring accessory

Ø100 sample tray, Ø100 special sample tray (shallow tray for powder samples), sample gland, dustpan, scraper, brush



### Features

1. Suitable for a wide range of sample types, such as granules, flakes, powders, pastes, etc.
2. Customized sample trays for special samples, e.g. fertilizer, asphalt
3. Easy loading, flattening of granular samples and scraping of powder samples
4. Sample tray is easy to clean and can effectively prevent cross contamination
5. Rotation of the sample tray to improve the representativeness and accuracy of the measurement of inhomogeneous samples
6. Fast analysis of multiple components such as moisture, crude fat, crude protein, crude fiber, crude ash, etc. within 10 seconds
7. Advanced grating technology and indium gallium arsenide detector for excellent signal-to-noise ratio
8. Instrument built-in standard substance, with automatic diagnosis and fault prompt function
9. Auto-collimation module design is adopted for the light source that light source replacement can be achieved easily without the need for adjustment
10. Software applicable to different management permissions



Place the sample tray



Change the light



Typical application scenarios

### Specifications

|                           |                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------|
| Host size                 | (403 x 391 x 373.5) mm                                                                |
| Weight                    | 20 kg                                                                                 |
| Applicable samples        | Grain and feed, Fertilizer products                                                   |
| Sample status             | Solids such as granules and powders                                                   |
| Assay method              | Diffuse reflection                                                                    |
| Light source              | Tungsten halogen lamp                                                                 |
| Light source power        | 5 V/ 10 W                                                                             |
| Detector                  | TEC refrigerated and temperature-controlled indium gallium arsenide (InGaAs) detector |
| Wavelength range          | S( 1000~ 1800) nm &D ( 1000~2500)nm                                                   |
| Wavelength accuracy       | ±0.2 nm                                                                               |
| Wavelength repeatability  | <0.01 nm                                                                              |
| Spectral resolution       | ( 10.95±0.3) nm@1529.5nm                                                              |
| Absorbance noise          | <50uA                                                                                 |
| Stray light               | <0.15%                                                                                |
| Scanning speed            | 5 times/s                                                                             |
| Analysis time             | <30 s                                                                                 |
| Preheating time           | 30 min                                                                                |
| Power supply              | (220±20) V~/50Hz                                                                      |
| Communication interface   | USB 2.0                                                                               |
| Environmental temperature | (5~35)°C                                                                              |
| Environmental humidity    | (5%~85%) RH, non-condensing                                                           |



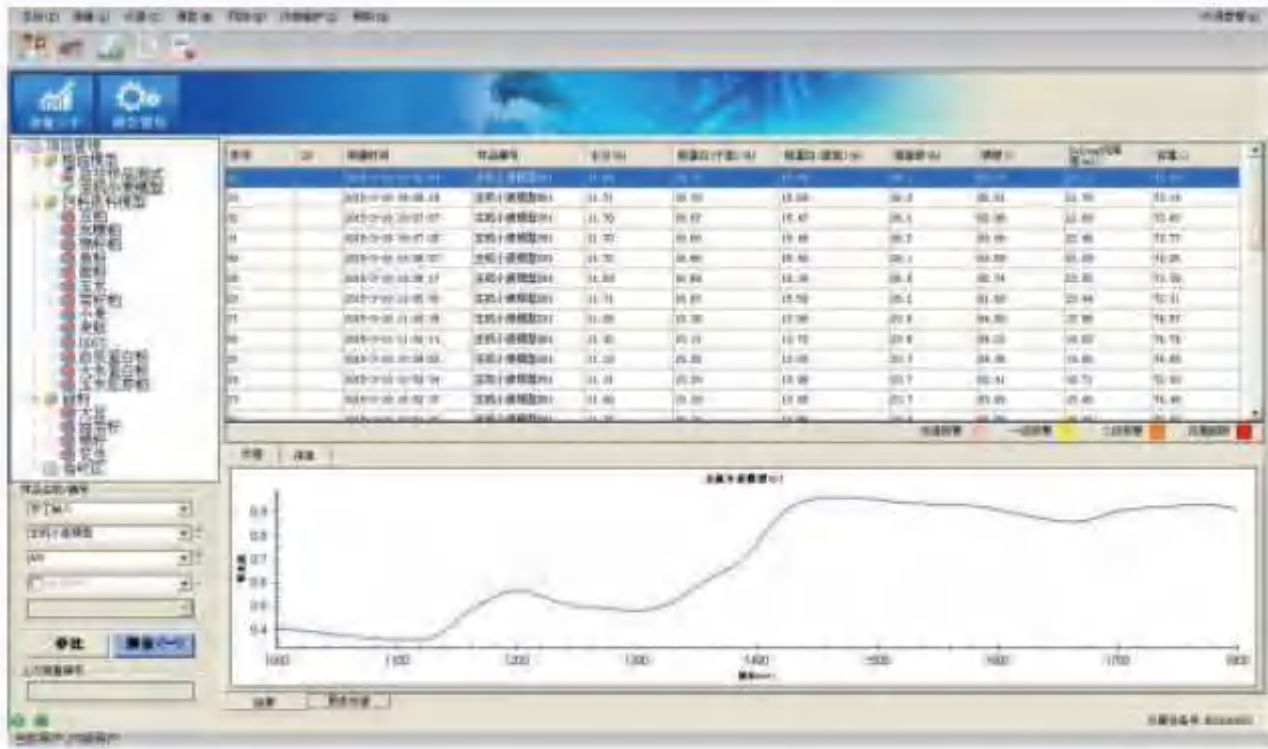
Product overview

RIMP analysis software is a special software product, has features of friendly user interface, and simple operation, and a professional software product combining instrument measurement and analysis, model management and network management of three major functions, support different rights management, administrator, operator and researcher account with different operating rights.The measurement data is stored, viewed, retrieved, counted and outputted report using a database, and the test data can be configured to be automatically uploaded to a network management system.

The software supports mainstream chemometric algorithms, including partial least squares (PLS) regression and artificial neural network (ANN) methods for quantitative analysis and soft independent modeling of class analogy (SIMCA) method and cluster analysis for qualitative analysis, etc. The generated models support the model encryption function to better protect the ownership of the model.

Measurement analysis

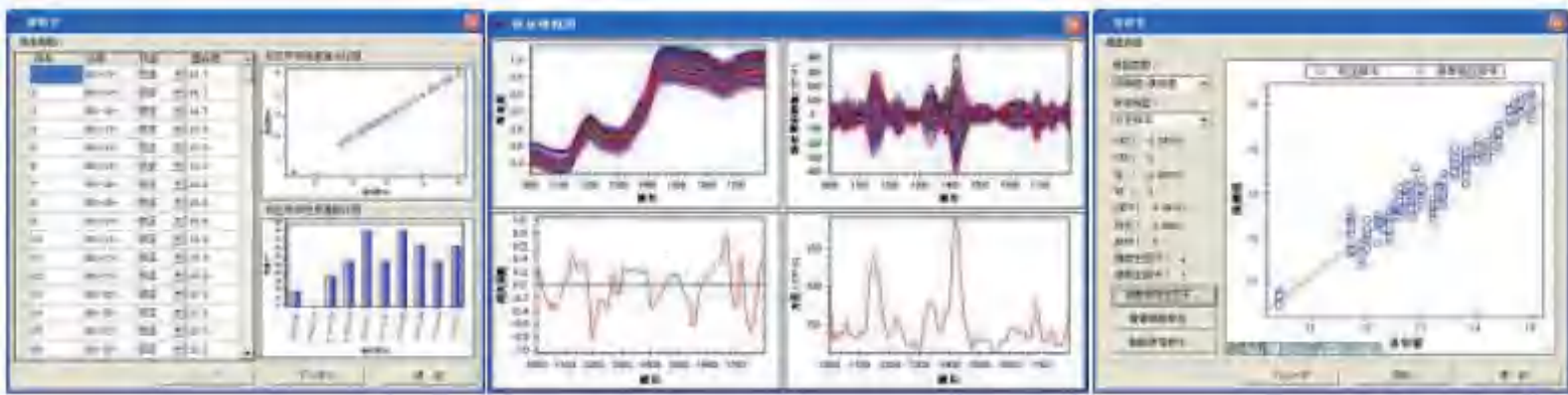
- Measurement analysis is used for spectral acquisition and automatic prediction in routine analysis work.The interface is user-friendly, intuitive and easy to operate, regardless of the operator's skill level. Its main functions are as follows:
- User management: new users can be created and managed with different rights.
  - Logbook management: records information about the operation of the instrument (logins, parameter modifications, model updates, exceptions, etc.).
  - Instrument diagnostics: self-test of instrument hardware, light source energy, absorbance noise and wavelength accuracy.
  - Data management: stores sample spectra and component property values in the database and provides data backup functions.
  - Sample management: provides functions for users to add product groups, add products, delete product groups and edit product properties.
  - Statistical analysis: provides statistical methods such as minimum, maximum, mean, variance and extreme deviation.
  - Report output: provides editable report templates to realize the customization function of reports.
  - Trend view: allows the view of historical trend graphs of the property values of each component.
  - Off-line prediction: provides the ability to re-predict historical spectra and models.



RIMP software measurement and analysis interface

Model management

- Model management is a tool used to establish a special relationship between the spectra and chemical values of a sample.It uses chemometric techniques to statistically analyse the data and build the corresponding mathematical models. Its main functions are as follows:
- One-click modeling: for quick and easy development and validation of models without the need for any chemometrics knowledge.
  - Expert modeling: users can optimize models by directly adjusting the modeling process parameters according to their own experience.
  - Quantitative analysis: provides quantitative algorithms of partial least squares regression (PLS) and artificial neural network (ANN).
  - Qualitative analysis: provides quantitative algorithms of soft independent modeling of class analogy (SIMCA) and cluster analysis.
  - Visual reporting: provides interactive visual views, mainly including property, pretreatment and model report views.
  - Model evaluation: provides external validation for the accuracy and repeatability of the models built.
  - Model encryption: encrypts and binds the model created for use with instruments to better protect ownership of the model.



Property view Pretreatment view Model report view

Networking function

The networking function is implemented by the network management platform.The network management platform consists of a host and multiple sub-computers.The host is used to scan modeling samples, monitor and upgrade models.The host model is adjusted to match the data analyzed by the standard chemical analysis laboratory.The host model is upgraded and updates are automatically released to the sub-computers via the network. Through networking, the web server can obtain real-time information on the performance and status parameters of each instrument, the sample testing records of the instrument, etc. Through the comprehensive judgment of this information, the operation of the instruments in different locations can be understood in a timely manner, realizing the real-time monitoring of the group of instruments.



Overview of the NIR base model

By establishing long-term cooperation with domestic grain authority testing institutions and central laboratories of domestic grain, oil and feed groups, we have continuously developed and accumulated model data, as well as after more than 10 years of efforts, we now have more than 50 kinds of basic models, especially for the grain, oil and feed industry, and have accumulated thousands of spectra. These analytical models can be used with simple calibration, with high analytical model data accuracy and the average error generally controlled within 5% relative error, and excellent test results can be obtained.

List of the NIR base models

| Sample source | Variety             | Test indicators                                                                                                                        |
|---------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Grain         | Wheat               | Moisture, crude protein, crude fat, crude fiber, ash, Zeleny settling value, wet gluten, hardness, fatty acid value                    |
|               | Flour               | Moisture, crude protein, ash, wet gluten, settling value, water absorption                                                             |
|               | Corn                | Moisture, crude protein, crude fat, crude fiber, ash, starch, phosphorus, amino acids                                                  |
|               | Frozen corn         | Moisture                                                                                                                               |
|               | Fine rice           | Moisture, crude protein, straight-chain starch, taste quality, consistency                                                             |
|               | Brown rice          | Moisture, crude protein, fatty acid value                                                                                              |
|               | Rice                | Moisture, crude protein, fatty acid value, straight-chain starch, tasting score                                                        |
| Oilseeds      | Soybeans            | Moisture, crude protein, crude fat, water-soluble protein, fatty acid value                                                            |
|               | Soybean meal        | Moisture, crude protein, crude fat, crude fiber, ash, protein solubility, amino acids                                                  |
|               | Rapeseed            | Moisture, crude protein, crude fat, erucic acid, thioglycoside, palmitic acid, stearic acid, linoleic acid, oleic acid, linolenic acid |
|               | Rapeseed meal       | Moisture, crude protein, crude fat, crude fiber, ash, protein solubility, amino acids                                                  |
|               | Cottonseed          | Moisture, crude protein, crude fat                                                                                                     |
|               | Cottonseed meal     | Moisture, crude protein, crude fat, crude fiber, ash                                                                                   |
|               | Corn germ           | Moisture, crude protein, crude fat                                                                                                     |
|               | Oil sunflower       | Oil sunflower meal                                                                                                                     |
|               | Moisture, crude fat | Moisture, crude protein, crude fat                                                                                                     |
|               | Safflower seed      | Moisture, crude fat, linoleic acid                                                                                                     |
|               | Peanut flour        | Moisture, crude fat                                                                                                                    |
|               | Peanut kernel cake  | Moisture, crude protein, crude fat, ash                                                                                                |
|               | Peanut meal         | Moisture, crude protein, crude fat, ash                                                                                                |
|               | Sesame cake         | Rice bran                                                                                                                              |
|               | Moisture, crude fat | Moisture, crude protein, crude fat, ash, fiber, acid value                                                                             |
|               | Rice bran meal      | Moisture, crude protein, ash                                                                                                           |
| Feedstuffs    | Fish meal           | Moisture, crude protein, crude fat, ash, calcium, phosphorus, acid value, salt, amino acids                                            |
|               | DDGS                | Moisture, crude protein, crude fat, crude fiber, ash, calcium, phosphorus                                                              |
|               | Corn germ meal      | Moisture, crude protein, crude fat, crude fiber, ash                                                                                   |
|               | Cottonseed protein  | Moisture, crude protein, ash                                                                                                           |
|               | Rice protein powder | Moisture, crude protein, crude fat, ash                                                                                                |
|               | Meat & bone meal    | Moisture, crude protein, ash, calcium, phosphorus                                                                                      |
|               | Broken rice-flour   | Moisture, crude protein, crude fat, ash                                                                                                |
|               | Secondary flour     | Moisture, crude protein, crude fat, crude fiber, ash                                                                                   |

| Sample source      | Variety                    | Test indicators                                                                                                                                                                                                            |
|--------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Grain              | Whey powder                | Moisture, crude protein, ash, lactose, salt                                                                                                                                                                                |
|                    | Corn protein powder        | Moisture, crude protein, crude fat, ash                                                                                                                                                                                    |
|                    | Plasma protein powder      | Moisture, crude protein, ash, solubility                                                                                                                                                                                   |
|                    | Fermented soybean meal     | Moisture, crude protein, ash, acidity, small peptides (acid-soluble protein)                                                                                                                                               |
|                    | Wheat bran                 | Moisture, crude protein, ash                                                                                                                                                                                               |
|                    | Meat meal                  | Moisture, crude protein, crude fat, ash, amino acids                                                                                                                                                                       |
|                    | Cassava                    | Moisture, crude protein, ash                                                                                                                                                                                               |
|                    | Beer lees                  | Moisture, crude protein, crude fat, crude fiber                                                                                                                                                                            |
| Finished feed      | Shrimp shell powder        | Moisture, crude protein, ash                                                                                                                                                                                               |
|                    | Large pig feed             | Moisture, crude protein, crude ash, calcium, phosphorus, salt, crude fat, crude fiber                                                                                                                                      |
|                    | Creep feed                 | Moisture, crude protein, crude ash, calcium, phosphorus, salt, crude fat, crude fiber                                                                                                                                      |
|                    | Pig concentrate            | Moisture, crude protein, crude ash, calcium, phosphorus, salt, crude fat, crude fiber                                                                                                                                      |
|                    | Small and medium pig feed  | Moisture, crude protein, crude ash, calcium, phosphorus, salt, crude fat, crude fiber                                                                                                                                      |
|                    | Layer chicken and duck mix | Moisture, crude protein, ash, calcium, phosphorus                                                                                                                                                                          |
|                    | Meat chicken and duck mix  | Moisture, crude protein, crude fat, crude fiber, ash, calcium, phosphorus, salt                                                                                                                                            |
| Forage industry    | Shrimp feed                | Moisture, crude protein, crude fat, ash, calcium, phosphorus, salt                                                                                                                                                         |
|                    | Fish mix                   | Moisture, crude protein, crude fat, ash, calcium, phosphorus                                                                                                                                                               |
|                    | Hay                        | Fructans, NDF, IVPD, potassium, crude ash, ADF, sugars, WSC, crude fat, magnesium, crude protein, lignin, phosphorus, calcium, dry matter                                                                                  |
|                    | Alfalfa hay                | NDF, IVPD, potassium, crude ash, ADF, crude fat, magnesium, crude protein, lignin, phosphorus, calcium, dry matter, moisture, RUP                                                                                          |
|                    | Alfalfa silage             | NDF, IVPD, potassium, crude ash, ADF, crude fat, magnesium, crude protein, lignin, phosphorus, calcium, dry matter, moisture, RUP                                                                                          |
| Forage industry    | Fresh maize silage         | NDF, crude protein, ADF, dNDF, IVPD, NDF, starch, dry matter                                                                                                                                                               |
|                    | Gasoline                   | Octane number (RON, MON), density, olefins, aromatics, initial distillation point, 10% distillation range, 50% distillation range, 90% distillation range, final distillation point, oxygen content, sulfur content        |
|                    | Diesel fuel                | Cetane number, density, initial distillation point, 50% distillation range, 90% distillation range, 95% distillation range, final distillation point, freezing point, cold filter point, viscosity at 20°C, sulfur content |
|                    | Aviation coal              | Flash point, density, viscosity at 20°C, initial distillation point, 10% distillation range, 50% distillation range, 90% distillation range, final distillation point                                                      |
| Food               | Cooking oil                | Unsaturated fatty acids, acid value, iodine value                                                                                                                                                                          |
| Textile            | Cotton-polyester blend     | Cotton content, polyester content                                                                                                                                                                                          |
|                    | Cotton-spandex blend       | Cotton content, spandex content                                                                                                                                                                                            |
|                    | Spandex-polyester blend    | Spandex content, polyester content                                                                                                                                                                                         |
| Tea                | Black tea                  | Moisture, tea polyphenols, caffeine, free amino acids, water extracts                                                                                                                                                      |
|                    | Instant tea powder         | Moisture, tea polyphenols, caffeine                                                                                                                                                                                        |
|                    | Tea polyphenol products    | Moisture, tea polyphenols, caffeine                                                                                                                                                                                        |
| Brewing industry   | Wine lees                  | Moisture, acidity, starch, reducing sugar                                                                                                                                                                                  |
|                    | Brewing wheat              | Moisture, crude protein, starch                                                                                                                                                                                            |
|                    | Brewing rice               | Moisture, crude protein, starch                                                                                                                                                                                            |
|                    | Brewing corn               | Moisture, starch                                                                                                                                                                                                           |
|                    | Brewing sorghum            | Moisture, starch, tannins                                                                                                                                                                                                  |
| Additives industry | Non-dairy creamer          | Moisture, crude protein, crude fat                                                                                                                                                                                         |