Infratec™ 1241
Sample Transport Module

The Infratec™ 1241 Grain Analyzer is a modular design. The Sample Transport Module (STM) can be used for analysis of whole grain, flour, breeding samples, plant tissue, malt, green malt, beer or spirits.

Features and benefits

- Comes with all Infratec™ 1241 features and benefits.
- Analyzes solid and liquid samples for added versatility
- Handles small samples (>5 ml) to allow for research work
- Ready-to-use ANN application models for simplicity of use
- Multipurpose cuvette for ease of use
- Calibration development software to develop propriety PLS calibrations
- Application modes automatically set all parameters for whole grain or Sample Transport testing for ease of use

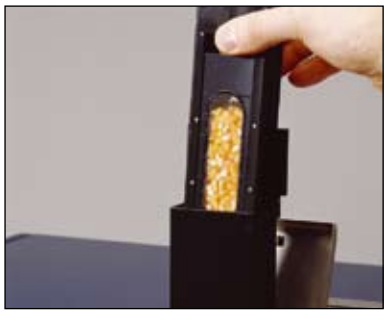
Sample transport module

The Infratec Sample Transport Module (STM) increases the flexibility of the instrument to handle sample types ranging from whole grain to flour to liquids. Cuvettes are available for a range of sample types and sizes.

In addition to the standard application models for protein, moisture and oil in grain, other ready-to-use application models are available e.g. alcohol and extract in beer and moisture in green malt. For additional applications users can develop their own calibrations using the calibration development software package.

The high transferability of calibrations and the network capability makes the instrument suitable for companies who want to control quality and instrumentation from a central location to guarantee identical results in all locations. Calibrations can be developed during a research phase on small sample sizes for later transfer to an Infratec operated in the regular whole grain mode.

Cuvettes are available for a range of sample types and sizes.



Installing the sample transport module in an Infratec™ 1241

The sample transport module (STM) can be fitted to any Infratec™ 1241. After installation of the STM the instrument can be used with either the sample transport module or for normal grain applications.

Normal whole grain samples can be analyzed directly, just by pouring them into the hopper, selecting the application model and pushing the analyze button. The STM mechanism can be permanently installed in the Infratec 1241 as switching between ordinary usage and STM mode is made by selecting the appropriate application model from the menu – the instrument automatically adjusts all analysis parameters.

Operating the sample transport module

A cuvette suitable for the sample type is selected. A top loaded cuvette for simple analysis of whole grain samples or a system consisting of separate cuvettes and a cuvette holder. This solution is recommended for liquids and samples which are difficult to pour into the top loaded cuvette. It is also possible to analyze only partially filled cuvettes. The minimum sample size required is commodity dependent, for corn/soybean a minimum of 12 ml is needed. For additional information see page 4.

To analyze a sample, place the cuvette in the cuvette holder and place the holder in the STM transport mechanism. Start analysis and the required number of subsamples will be made. When the result is presented, the cuvette holder can be removed and the next analysis started. The procedure for liquid samples is similar except that a cap must be put on the cuvette.

Cuvette holder

The cuvette holder is used to transport the sample cuvette to the light path where the measurement takes place. A bayonet grip makes sure that the cuvette stays in place.

Sample cuvettes

The sample cuvette consists of two parts, a top and a bottom part. The bottom part is the same for all sample cuvettes. The five different top parts depend upon the path length required. The different path lenghts available are 6 mm, 10 mm, 18 mm, 25 mm and 29 mm.

Top-loaded cuvette with optional inserts

The top-loaded cuvette is suitable for grain and other sample types, which can be poured into the cuvette. This cuvette does not need any separate cuvette holder. The path length can be adjusted to 6, 10, 18, 25 or 29 mm.

Some applications require a very small sample volume. By placing an insert in a top-loaded cuvette, the required volume can be further reduced. Inserts are available to the top-loaded cuvette. A table with sample volumes for the different path lengths and inserts can be found on page 4. When using inserts the spectra will be slightly different from when not using inserts. This has to be taken into account when developing calibrations.

Sunflower cuvette

The sunflower cuvette is suitable for ground sunflower or meals and is an alternative to the Flour Module sample cups. For inhomogeneous samples the sunflower cuvette offers advantages since it enables measurement on a larger sample size. When used together with ISW 3.41 or higher it is possible to save multiple scans for each cavity.

The path length is 2/1,5 mm, the same as on the sample cups with blue inserts, which means that scans taken with the sample cups can be re-used when developing calibrations for the sunflower cuvette.

Liquid cell

This cell is suitable for most types of liquid applications. The cuvette is supplied complete with a small cap to prevent evaporation of solvents or chemicals like alcohol.

The robust liquid cell is made of aluminium. The glass windows are pressed into position and no glue is used, making them insensitive to solvents. Sample volume is approximately 25 ml with a path length of 29 mm.

Malt / Barley

Malt and barley can be analyzed directly with the Infratec 1241. With the use of the STM module also green malt and beer can be analyzed. In this way one instrument can handle the whole chain of analysis involved in the brewing process, keeping investment needs low and saving valuable bench space.

Existing ANN application models for moisture and protein in both barley and malt have very good performance and cover varieties from all over the world.

Green malt

The moisture content of green malt is a critical parameter for a correct malting process. The high moisture content of green malt makes it difficult to analyze. Using the STM accurate and rapid measurements of moisture content can be carried out.

Beer

Using the liquid cells with the STM gives a very simple and robust at-line instrument for beer analysis. The system is available with ready-to-use application models for alcohol and real extract. From these two parameters the software can calculate several other beer parameters directly, including original extract, real degree of fermentation and calories. The only sample preparation needed is a simple degassing so that no bubbles interfere with the light during analysis. The application models cover most types of beer with high accuracy and repeatability.

Alcohol in spirits and ready-to-drink mixes

Alcohol in spirits and other alcoholic beverages is of importance due to its high value and for taxation reasons. The liquid cuvette in the STM enables highly accurate analysis of the alcohol content.

Small samples of grain

Plant breeders often need to analyze small samples of grain, sometimes from one single ear, to evaluate the results of breeding trials. By using the sample cell together with an insert, the sample volume can be reduced. The software also allows analysis of sample cuvettes that are only partially filled. This decreases required volume further. See table on page 4.

Crop management

During the growth season it is important to know about the health of the plant. The nitrogen and chlorophyll levels in a plant are good indicators. Based on the nitrogen content the producer/farmer can adjust the amount of fertilizer to be used on the field. The Sample Transport Module, together with the Colour Module, makes it possible to analyze both nitrogen and chlorophyll contents in plant materials.

System description:
Infratec™ 1241 Grain analyzer 220-240/110-120 V, 50-60 Hz, cpl.
Infratec File Tool, 1241
WinISI™ III Calibration Development Software
ODIN, Application Model Maker
Infratec Data logger
FOSS DataLink

A selection of ready to use calibrations:
Green malt (moisture)
Barley Malt (protein, moisture, extract and soluble protein)
Beer (alcohol, real extract)

Optional modules:
Sample Transport Module
Test Weight Module
Flour Module

Accessories:
Sample cuvette bottom part
Sample cuvette top part, 6 mm path length
Sample cuvette top part, 10 mm path length
Sample cuvette top part, 18 mm path length
Sample cuvette top part, 25 mm path length
Sample cuvette top part, 29 mm path length
Top-loaded cuvette, path length 6/10/18/25/29 mm (adjustable)
Insert for top-loaded cuvette, 6 mm
Insert for top-loaded cuvette, 10 mm
Insert for top-loaded cuvette, 18 mm
Insert for top-loaded cuvette, 25/29 mm
Sunflower cuvette
Liquid cuvette

Operation Data:

No of subsamples:	1-10 using STM.	Analysis time:	30 sec. for 5 subsamples.

Technical Data:

Voltage:	220-240V 50-60Hz or 110-120V 50-60Hz
Rated current:	1.0A (110-120V) / 0.5A (220-240V)
Dimensions W × D × H:	500 × 570 × 375 mm
Weight:	31 kg
Monochromator:	Scanning
Wavelength range:	570 - 1100 nm
Optical bandwidth:	7 nm
Number of data points/ scan:	265
Mode:	Transmittance
Light source:	Tungsten halogen lamp
Detector:	Silicon
Storage Media:	Flash disk, USB Memory Stick
Display:	640 × 480 TFT LCD

Interface:

Printer:	25 pins parallel port
Modem:	9 pins serial port
External PC:	9 pins serial port
LAN:	RJ45
Keyboard/Barcode:	PS/2
USB Ports:	2 pcs
Remote I/O:	15-pin High Density DSUB
Diagnostics:	Selftests for internal communication, monochromator and detector (offset, gain and noise)
System protection:	Dust and humidity protected

Sample volume for the different cuvettes

	Sample cuvette		Top-loaded cuvette		Top-loaded cuvette with insert	
Path length	**Full cuvette**	**20% full cuvette**	**Full cuvette**	**20% full cuvette**	**Full cuvette**	**20% full cuvette**
6 mm	26 ml	5 ml	22 ml	5 ml	12 ml	3 ml
10 mm	43 ml	9 ml	38 ml	8 ml	19 ml	4 ml
18 mm	79 ml	16 ml	70 ml	14 ml	33 ml	7 ml
25 mm	110 ml	22 ml	100 ml	20 ml	48 ml	10 ml
29 mm	125 ml	25 ml	110 ml	22 ml	59 ml	12 ml

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