ABB MEASUREMENT & ANALYTICS

MB3600-HP12
Laboratory FT-NIR heavy oils analyzer

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Measurement made easy

The MB3600-HP12 Heavy oils analyzer is a rugged and high performance industrial FT-NIR spectrometer for R&D and QA/QC applications on heavy hydrocarbon applications.

Contents

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Adapted for crude oil, fuel oil and heavy oil upgrader unit feed applications

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01 Oil tanks farm

The MB3600-HP12 is a maintenance-free bench-top analyzer enabling fast (less than 2 minutes measurement time) determination of several quality properties in heavy hydrocarbons. It is equipped with a variety of sample cell and sample introduction options to facilitate easy measurement of heavy samples.

These include a heavy-duty, high-pressure electrically heated sample cell which allows sample to be introduced, flushed and the cell washed using an optional sample handling rig.

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01 Oil tanks farm

A versatile method-development tool for heavy oils

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02 MB3600-HP12 Heavy
Oils analyser solution

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02

Features

The MB3600-HP12 Heavy Oils analyzer is equipped with the new ABB ACC3-3020 electrically heated sample cell. This cell is optimized for use with heavy oil samples, and is provided with wedged transmission windows which enable the cell to be left in situ in the MB3600-HP12 sample position during the empty cell background measurement. This greatly facilitates ease and speed of measurement. Samples and wash fluids may be introduced into the sample cell using either the optional heatable sample pump or the optional trace-heated high-pressure sample panel, or by other means convenient for the specific sample type. The MB3600-HP12 analyzer comes with the complete Horizon MB suite of ABB laboratory FT-NIR software including HorizonMB Pro, HorizonMB QA and HorizonMB Quantify, so it is fully enabled and ready for measurement, method development and calibration modelling.

Benefits

• Low cost of ownership
• Extremely low-maintenance
• Rugged and intuitive user interface
• Calibration wizard for method development
• Simple transfer of developed calibrations to other ABB laboratory and process FT-NIR analyzers
• State-of-the-art analytical performance
• Suitable for the development of multi-property, multi-stream calibrations such as Distillation, True Boiling Points, Kinematic Viscosity, API Gravity, TAN,
• Standard cell pathlength 0.5 mm (4,000 to 5,000 cm^{-1} recommended calibration range)
• Option for 2 mm pathlength (5,500 to 7,500 cm^{-1}) and 5 mm (6,500 to 9,500 cm^{-1} recommended calibration range)
• Standard FT-NIR spectrometer platform (MB3600) for range 3,750 to 10,000 cm^{-1}
• Option for Mid-IR version for range 650 to 6,000 cm^{-1}, 0.2 mm pathlength cell.

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Maintenance-free analyzer

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03 HorizonMB QA
software interface

**User-friendly operator interface
for routine analysis**
The HorizonMB QA operator interface module
makes running QA/QC and routine applications
simple and reliable for laboratory staff by
providing intuitive workflow along with integrated
spectrometer and accessory control. The software
guides the user in every step from analysing
routine samples to designing QA/QC applications
and implementing turnkey methods. HorizonMB QA
also enables plant connectivity by automatically
generating a tab-separated file with detailed
results and parameter information for each sample
analysis performed with a procedure. This file can
then be imported by a LIMS system.

An exceptionally low cost of ownership
While the MB3600-HP12 vertical design provides
a minimal footprint, it is also an analyzer with
minimal cost of ownership. Our engineers have
designed the modular components of the
MB3600-HP12 to provide the longest product life
on the market according to the following key
principles:
• no maintenance:
• no adjustments:
• no wear of the scan mechanism:

As a result, the pre-aligned source module with
electronic stabilization is designed to operate
for 10 years without replacement, and the
solid state laser-based metrology module has
a 20 year lifespan. All MB3600-HP12 optics are
non-hygroscopic so that no instrument purging
is required for optical protection.

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Robust field-proven analyzer

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04 MB3600-HP12
heavy oils analyzer

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Quick and simple analysis for fast product assay
Traditional laboratory assays for crude oil and other heavy products can be extremely laborious, time-consuming and with some issues of analysis repeatability. The MB3600-HP12 heavy oils analyzer allows the opportunity to develop calibrations based on these same standard laboratory tests, and with equivalent reproducibility, but once in place they allow for very rapid, high-precision sample assays in a fraction of the time of the standard laboratory test. This enables the crude oil, bunker fuel, heavy oil unit feed or other stream qualities to be made available in a timely and useful manner for quality release or downstream process setup and optimization. For example in crude blending, the blend quality can be determined prior to committing to the crude distillation column feed.

Reliable and effective sample cell
The ABB ACC3-3020 electrically heated high-pressure sample flow cell has been proven to offer exceptional ease-of-use when handling heavy oil samples. The oil samples and wash fluids may be either filled & flushed using a basic sample pump, or, where necessary injected and cleaned under pressure using an optional sampling panel.

Seamless laboratory-to-process calibration transfer
ABB has developed manufacturing methods that ensure all our laboratory and process FT-NIR analyzers are highly stable, have a highly linear photometric response, and provide identical absorbance spectra. This enables calibration transferability between laboratory and process analyzers without any additional effort.

MB3600-HP12 base system and options

MB3600 FT-NIR Analyzer
- Pre-configured desktop PC
- High-performance TE cooled InAs detector
- Full HorizonMB Pro, QA & Quantify software package
- Extended lifetime laser and NIR source
- Mid-IR version 650 to 6,000 cm^{-1} available on special request

ACC3-3020 / ACC118
Cell & Heater
- Electrically heated 25 to 80 °C (77 to 176 °F)
- RTD sensor and temperature controller
- ¼ inch pipe connections
- 100 barg max operating pressure
- 0.2 mm, 0.5 mm, 2 mm and 5 mm pathlength options

Mid-IR version available on special request, BaF$_2$ windows (0.2 mm pathlength), 22 barg (325 psig) maximum operating pressure.

ACC3-10000 Sample Introduction Panel
- Panel may be pressurized up to 100 barg
- Integrated refillable wash fluid cylinders
- Sample cylinder with quick connect for ease of manipulation.
- Heated sample lines, ¼ inch, up to 80 °C (176 °F)
- 61 cm (24 in) heated flexible hoses to the ACC3-3020 cell.

RHS1CKC Sample Introduction Pump
- Ceramic / PVDF / 316SS wetted parts
- 60 ml/min max flow rate
- ¼ inch pipework connections
- Forward / Off / Reverse toggle switch
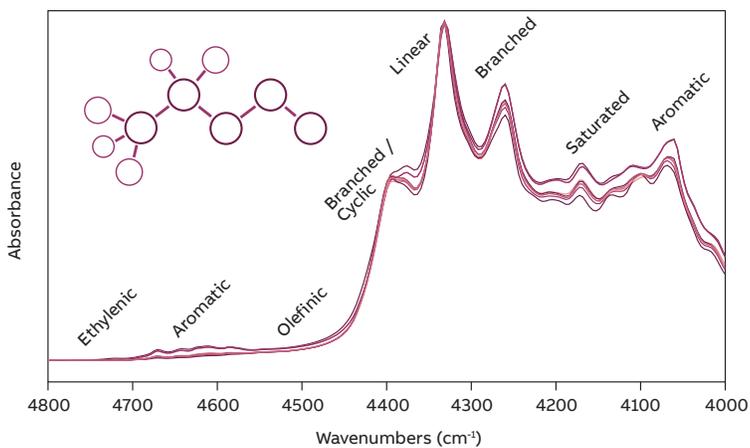- Alternate configuration with heated pump head available on special request

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Calibration development for crude assay and heavy oils

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05 Crude oil samples

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06 Equal data quality for all hydrocarbons from light white to heavy dark samples
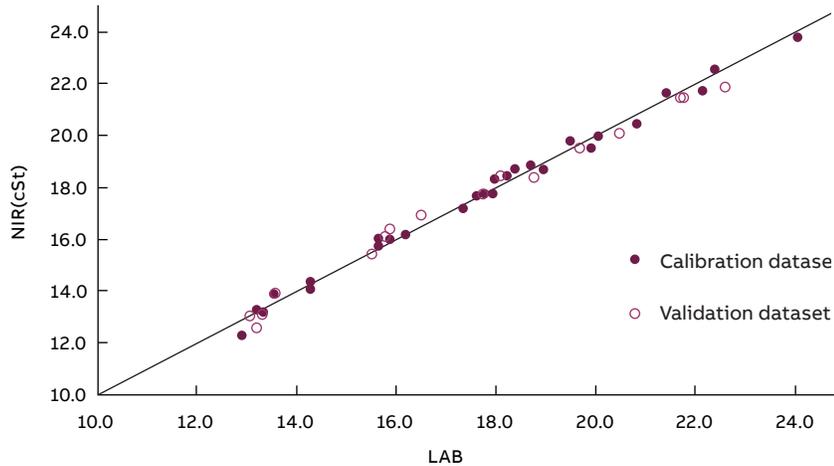

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Calibration development for crude assay and heavy oils

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07 Equal data quality for all hydrocarbons from light white to dark samples

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08 Example Viscosity (cSt) @ 50degC for heavy gasoil

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FT-NIR spectroscopy has a significant advantage for the development of calibrations and the analysis of dark, heavy oil or crude oil samples because the data quality in the long-wavelength near-infrared, accessible at high signal- to-noise ratio using FT-NIR instruments, allows the measurement of black samples (such as crude oil) with equal quality as compared with simple light, white hydrocarbons such as gasoline. In the long-wave near-infrared gasoline and crude oil are equally transparent. Calibration services are available on request, please contact your local ABB sales office

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