

**Work<sub>ir</sub>**<sup>TM</sup>

Industrial FT-IR Spectrometer



• **Modular** • **Compact** • **Reliable**

The **Work<sub>ir</sub>** is an industrial FT-IR spectrometer designed for on-line process monitoring. Derived from the highly successful Bomem MB Series of laboratory FT-IR spectrometers, it provides spectroscopic performance superior to that of other industrial units.

This instrument is particularly well suited for composition determination of organic process streams in industries such as refining, petrochemicals, polymers, plastics, chemicals, pharmaceuticals, and foods. The **Work<sub>ir</sub>** is designed for use with extractive sampling systems. The sample interface is compatible with Axiom's Axiot Process FT-IR sampling accessories.

Since the **Work<sub>ir</sub>** is based on the MB series, you can develop analytical methods on an MB spectrometer in the laboratory and transfer them to the **Work<sub>ir</sub>** without adjustment. Methods will also transfer directly from one **Work<sub>ir</sub>** to another. The instrument is permanently aligned at the factory. Because of its extreme stability, methods never require adjustment, even after instrument maintenance.

The **Work<sub>ir</sub>**'s compact, flush-mount chassis fits economically into either rack-mount or wall-mount systems. It is extremely sturdy, and can be operated in any orientation.

The **Work<sub>ir</sub>** comes with CAAP (Continuous Automated Analysis Program), a part of the Bomem family of industrial software. CAAP allows the user to set up fully automated routines for run-time analyses. It is perfect for sequencing the analyses, controlling the sample system valves and pumps, plotting trends, and performing a vast choice of data archiving and data communication tasks.

CAAP has a comprehensive man-machine interface to accommodate all categories of users, including operators, maintenance staff, and system designers. It displays both text and graphs of measured concentrations, alarms, analyzer status messages, trends, and spectra. It is easily customized to your specific applications.

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# WORK<sub>ir</sub><sup>TM</sup> SPECIFICATIONS AND FEATURES

## Specifications

- Best resolution: 0.7 cm<sup>-1</sup>, unapodized
- Wavenumber reproducibility:  
Work<sub>ir</sub> 100 and 104; 0.1 cm<sup>-1</sup> at 1918 cm<sup>-1</sup>  
Work<sub>ir</sub> 160; 0.04 cm<sup>-1</sup> at 7300 cm<sup>-1</sup>
- Wavenumber repeatability: 0.001 cm<sup>-1</sup>
- Calibration transferability test: All NIR instruments will reproduce the absorbance spectrum of toluene (4100-6000 cm<sup>-1</sup>) in a 0.5 mm cell at 28°C ±1° to within 0.002 A
- Signal-to-RMS-noise ratio at peak response is typically 30,000: 1 for the Work<sub>ir</sub> 100 for 1 min scan time, 4 cm<sup>-1</sup> resolution, open beam
- 100% line repeatability is within 0.1% over the 4000 to 550 cm<sup>-1</sup> range for MIR models and over the 8000 to 4000 cm<sup>-1</sup> range for NIR models, for 2 consecutive scans
- 100% line long-term stability does not exceed 2% deviation over 16 h over the 4000 to 550 cm<sup>-1</sup> range in MIR models and over the 8000 to 4000 cm<sup>-1</sup> range in NIR models
- Resolution is selectable from 1 to 64 cm<sup>-1</sup>, apodized, in steps of 2 X
- Scan Time: 3 s with DTGS, 1.2 s for fast detectors, at 4 cm<sup>-1</sup> resolution
- Beam diameter at beam stop: 2.5 cm
- Maximum beam divergence: 90 milliradians
- Overall dimensions: 17 1/2 in. W x 10 5/8 in. D x 6.43 in. H (49 cm x 44 cm x 16.3 cm)
- Weight: 46.2 lb (21 kg)

## Interferometer

- Four-port optical design eliminates retro-modulation induced artifacts
- Patented Michelson-type interferometer with 2-cube corner retro-reflectors mounted on a double pendulum swing arm
- Factory-prealigned interferometer and input/output optics; does not require adjustment by user
- Scanning is performed by rotating the swing arm on a flex pivot bearing, driven by an induction motor. This provides smooth, constant-velocity, perturbation-free scanning.
- Swing arm is balanced to permit operation in any orientation
- Self-compensating, single-plate beamsplitter/compensator
- Maximum scan length: 1 cm optical path difference both before and after centerburst
- Scan mode: double sided interferograms acquired in both forward and reverse directions
- He-Ne reference laser for: digital sampling, mirror velocity control, quadrature detection of scan direction, and fringe counting for path-difference determination
- Automatic white-light zero-path-difference location on power-up

## Interferometer enclosure

- The interferometer module, control electronics, power supply, source, and source power supply are housed in an aluminum housing
- Enclosed volume is desiccated by easily-changed cartridge with status indicator
- Purge inlet with disperser
- Electrical power, switch, fuses, data cable, and status lights are interfaced at a side panel
- Nema 12 rating

## Data acquisition

- Single-board electronics module provides: scan start-up logic with ZPD synchronization; 2 scan velocities selectable via a "personality" switch on the detector module; bi-directional coadding, 16-bit ADC with built-in sample and hold, 100 kHz max. rate; serial data transmission

## Computer interface

- SA bus compatible serial interface Computer
- The PC must be a 486 DX66 or better. The PC may be supplied by Bomem or by the client.

## Software

- CAAP

## Operating environment

- AC input: 120 or 240 V manually selectable
- Power consumption: 150 W
- Ambient temperature: -15° to 50°C non-operating, 0° to 30°C operating
- Relative humidity (operating): 0% to 95% non con-densing for Work<sub>ir</sub> 104, and Work<sub>ir</sub>160 models; 0% to 40% noncondensing for Work<sub>ir</sub> 100

Model	Internal Source	Optics	Detector	Spectral range cm <sup>-1</sup>
Work <sub>ir</sub> 100	SiC	KBr	DTGS	6,000-350
Work <sub>ir</sub> 104	SiC	ZnSe	non-hydroscopic window	6,000-510
Work <sub>ir</sub> 160	NIR	BK7	NIR DTGS	14,000-3,800

Specifications subject to change without notice.



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