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SPECIFICATIONS

MICROPLATE SCINTILLATION AND LUMINESCENCE COUNTER

1450 MicroBeta JET
Microplate Scintillation and Luminescence Counter

DESCRIPTION

MicroBeta® JET is a multi-detector instrument designed for liquid scintillation or luminescence detection of samples in microplates, tubes or on filters.

Three different MicroBeta models are available. Two manually loaded models have sample capacities of up to 16 or 32 plates. The third model is fitted with an external loading platform for fully automatic loading by robot systems.

MicroBeta JET also includes one or more reagent injectors for measuring prompt (or 'flash') reactions. Multi-detector versions of the instrument can have one or two Injector Modules installed to measure one or two injection and counting sequences. The single detector MicroBeta JET can have up to four Injector Modules.



MicroBeta® JET

STANDARD FEATURES

- **Choice of 1, 2, 3 or 6 detectors**, which can count in 96- and 24-well formats. Software features include the facility to count non-standard 4 x 6 formats.
- **Unique detector design** consists of two photomultiplier tubes (PMT), one positioned above the sample and one below. These count the sample from the top and bottom at the same time (coincidence counting), providing the best possible counting geometry and excellent counting efficiency for every assay type. MicroBeta is suitable for counting scintillation proximity assays with FlashBlue™ or SPA; filtration assays (e.g., with Millipore MultiScreen™); tissue culture plates; all solid (or dry) scintillators such as MeltiLex®; yttrium silicate; FlashPlate® microplates; and liquid scintillation counting are all ideal for use with the MicroBeta.
- **Automatic optimized photo-multiplier** movement gives the correct geometry for microplates, filtermats or tubes up to a maximum sample height of 45 mm. The maximum sample height in robot loading a MicroBeta is 20 mm.
- **Unique cassette-based sample changing mechanism** provides a versatile sample support system for all kinds of sample types, from microplates to microcentrifuge tubes to 4 mL LSC vials.
- **Cassette support for all sample type**s provides the only practical way to count flexible microplates, complete filtermats or tubes.
- **Bar code reader** that focuses on a reusable barcode on the cassette provides identification of up to 100 counting protocols and other counting commands.
- **Multiple reagent dispensing** in multi-detector instruments enables delivery of different reagents to the reading position of each detector and therefore specific wells in each plate. For example,

in the case of a six detector MicroBeta JET fitted with one injector module, up to six different reagents can be dispensed across each plate.

- **Counting modes** include single and dual label CPM, single and dual label DPM, ParaLux™ count mode and luminescence counting.
- **Crosstalk correction** is provided for optical and isotopic crosstalk in samples that can not be prepared in non-crosstalk format.
- **Instrument shelf stacking system** provides easy access and identification of samples.
- **Optimized counting conditions** for all the commonly counted isotopes are included as standard. Settings for other beta and gamma isotopes can be made by the user.
- **Instrument software** run on a Windows® XP interface. Standard software features include a Windows Workstation interface, Spectrum plot, ASCII, Excel® or CSV filing, column and or plate formats and context specific HELP function.
- **Counting control protocols** can be edited to include repeat, replicate and cycle counting.
- **Count delay options** can be used for an automatic, unattended assay start after an incubation period. Cycle delay and plate delay are also possible.
- **Live display** with 8 x 12 or 4 x 6 live display provides instant feedback to the user.
- **Counting commands** such as 'next sample' or 'next assay' commands are available while the counter is operating.
- **Count termination** is either by fixed time or by counting precision.
- **Optimized counting conditions** for all the commonly counted isotopes are included as standard. Settings for other beta and gamma isotopes can be made by the user.
- **Up to 100 normalizations** can be stored and linked to any one of 100 counting protocols to provide corrections for detector efficiencies and possible background and crosstalk.
- **Up to 100 standardizations** can be stored and linked to any one of 100 counting protocols to provide DPM results that are also corrected for detector efficiencies and possibly crosstalk.
- **ParaLux Count Mode** for scintillation proximity assays fully utilizes the advantage of twin photomultiplier tubes. Compared to all other methods, counting efficiency is increased by up to 500%. The ultra-sensitive, high dynamic range quench parameter, AQP(I), provides superior DPM calculations.
- **Easy DPM** includes pre-stored quench data that is modified by counting just two standard samples. Errors in sample preparation and lengthy standardization counting times are thereby avoided.
- **Three counting windows** enable counting data from three separate and independent counting regions to be obtained.
- **Background subtraction** enables fixed samples or values obtained from detector normalizations to be deducted from unknown CPM values.
- **Plate mapping** enable plate layouts to be entered for each protocol so that specific positions are counted.
- **Chemiluminescence correction** is an automatic correction for unwanted single photon activity. This is based on delayed coincidence and dual MCA technology.
- **Half-life correction** is a correction facility for CPM and DPM values. The zero time may be the start of the assay or a specified date and time.
- **Chemiluminescence correction** is an automatic correction for unwanted single photon activity. This is based on delayed coincidence and dual MCA technology.
- **Statistics monitor** detects and reports distorting contributions from static electricity.
- **DPM monitor** reports samples outside the range of the quench curve.
- **Freely-selectable data output options** in addition to standard count rate information include sample/plate ID, quench parameters, spectrum plot, date and time, CPM and DPM monitors and statistical analysis. Output can be customized in either column and/or plate format.
- **EasyGLP routines** are included for monitoring detector performance by counting standard samples. Results can be printed and saved to file.
- **Instrument-based diagnostic service routines** are used to verify instrument performance.
- **Passwords protection** for counting, normalization and standardization protocols is included.

AVAILABLE CONFIGURATIONS

Model	Detectors	Capacity Plates
1450-021	6	16
1450-022	3	16
1450-023	2	16
1450-024	1	16
1450-025[1]	6	RLS
1450-027[2]	6	32

[1] RLS, Robot Loading System, takes one plate at a time.
[2] 32-plate MicroBetas are supplied with a cart, 950 mm (width) x 660 mm (depth) x 712 mm (height).

EQUIPMENT SUPPLIED WITH MICROBETA JET MODELS

Model	Equipment Supplied
1450-021	1224-510 Windows WorkStation (1)
1450-022	1450-101 Flexible 96-well plate cassette (1)
1450-023	1450-102 Flexible 24-well plate cassette (1)
1450-024	1450-105 Rigid 96-well plate cassette (1)
1450-027	1295-041 Roller (1)
	1450-451 ID Support Plate (1)
	1450-452 ID Label Binder (1)
	1450-472 Normalization Standards (1)
	1450-940 Instrument Manual & Customer Application Folder (1)
	1450-401 Flexible 96-well plate (1)
	1450-402 Flexible 24-well plate (1)
	1450-514 Isoplate™ microplate (1)
	1450-461 Sealing Tape, permanent
	1200-439 SuperMix (1)
1450-025	1224-510 Windows WorkStation (1)
	1295-041 Roller (1)
	1450-451 ID Support Plate (1)
	1450-452 ID Label Binder (1)
	1450-472 Normalization Standards (1)
	1450-940 Instrument Manual & Customer Application Folder (1)
	1450-514 Isoplate microplate (1)
	1450-461 Sealing Tape, permanent (1)
	1200-439 SuperMix (1)

JET OPTIONS

JET System hardware is factory fitted and must be specified with the order. These components include all the fixed internal parts.

- **1450-221 JET Assembly** for 16 Shelf Model with 96/24-well.
- **1450-222 JET Assembly** for 32 Shelf Model with 96/24-well.

Injector Modules

The Injector Modules are external to the counter and can be installed at any time in just a few minutes by the user. An Injector Module also includes the Injector Assembly. The Injector Assembly houses the reagent tubes and fiber-optic coupling. It is automatically driven into position if selected in a counting protocol. If injection is not selected, the Injector Assembly is positioned away from the photo-multiplier tubes and consequently counting performance is identical to that of the MicroBeta TriLux. Like the Injector Modules, this device is designed to be installed by the user.

- **1450-230 Injector Module:** One single channel pump for single detector MicroBeta JET
- **1450-231 Injector Module:** Two single channel pumps for single detector MicroBeta JET
- **1450-232 Injector Module:** Three single channel pumps for single detector MicroBeta JET
- **1450-233 Injector Module:** Four single channel pumps for single detector MicroBeta JET
- **1450-234 Injector Module:** One twin channel pump for two detector MicroBeta JET
- **1450-235 Injector Module:** Two twin channel pumps for two detector MicroBeta JET
- **1450-236 Injector Module:** One triple channel pump for three detector MicroBeta JET
- **1450-237 Injector Module:** Two triple channel pumps for three detector MicroBeta JET
- **1450-238 Injector Module:** One six channel pump for six detector MicroBeta JET
- **1450-239 Injector Module:** Two six channel pumps for six detector MicroBeta JET

WINDOWS WORKSTATION SOFTWARE

MicroBeta Windows WorkStation Software runs under Windows versions 2000 and XP and has the following features:

Operating Features

- Live spectrum display.
- Numeric or color intensity display in 96 or 24 formats.
- Full control of injector module setup and automatic functions.
- Protocol Groups.
- Protocol templates with user defined restrictions for quick and easy editing.
- Protocol specific plate mapping with '*Auto fill*' feature.
- Master plate for fast plate map editing.
- Protocol editing while the counter is operating.
- '*Execute*' function automatically boots selected application software for data analysis.
- '*Plate Orientation*' caters for plates that are rotated or inverted during sample preparation.
- Status bar indicates instrument operation.
- Hypertext HELP.
- Password protection.

Filing Features

- Excel, ASCII or CSV file types in column and or plate formats.
- Spectrum file saving.
- Automatic file run numbers to avoid loss of data by overwriting old data.
- File names can combine several identifiers such as counter name, protocol owner, protocol name, protocol number, plate index or plate ID.

Networking Features

- Error Handler can call up a network application to send an error message to, for example, the 'owner' of a protocol.

SOFTWARE OPTIONS

- **1450-3010 MicroBeta Workstation software Version 4.0 with 21 CFR Part 11 compatibility** (installed with new instrument orders only). Contains Enhanced Security functionality for workstation 4.0 program installed and on CD, manual, security lock, license ID key for Enhanced Security mode, license to use the program on one MicroBeta. Requires MicroBeta Workstation.
- **1450-3020 MicroBeta Workstation software Version 4.0 with 21 CFR Part 11 compatibility for field upgrade.** Contains Enhanced Security functionality for workstation 4.0 program on CD, manual, security lock, license ID key for Enhanced Security mode, license to use the program on one MicroBeta, field upgrade installation and training.

OPTIONS

- **1450-212 Temperature control** option for upper photomultiplier luminescence counting. Peltier device maintains constant temperature down to 7 °C below ambient.
- **1450-214 Plate ID Barcode reader** option for reading barcodes fixed to short right hand edge of plate. Compatible with Code 39, Codabar, Code 128, Interleaved 2 of 5, UPL and EAN languages.

ACCESSORIES AND CONSUMABLES

Microplates

A number of PerkinElmer's microplates are ideally suited for use with the MicroBeta. These include:

- **For luminescence assays:**
  - OptiPlate™ white opaque 96-well microplates
- **For filtration assays:**
  - AcroWell™ Filter Plate, 96-well microplate, 0.45 µ pore size
  - DEAE filtermat, suitable for assays using any negatively charged labeled compound
  - Filtermat A, 24- and 96-well GF/C glass fiber filtermats printed on both sides
  - Filtermat B, 24- and 96-well thick GF/C glass fiber filtermats printed on both sides
  - GF/P30 filtermat, suitable for assays using positively charged labeled compounds
- **For general liquid scintillation counting:**
  - Isoplate 96-well rigid microplates
  - Visiplate™ 24-well rigid microplates
  - Flexible 24-well and 96-well microplates for better chemical solvent resistance
- **For solid scintillation counting:**
  - LumaPlate white 96-well microplate with scintillant coated on the bottom
  - Deep Well LumaPlate white 96-well deep well microplate with scintillant coated on the bottom
- **For cellular assays:**
  - Isoplate black or white 96-well sterile, tissue culture-treated individually-wrapped microplates with clear wells and lids
  - SpectraPlate™ clear 96- and 384-well sterile, tissue culture-treated individually-wrapped microplates with lids
  - Visiplate black or white 24-well sterile, tissue culture-treated microplates with clear bottoms and lids

Cassettes & Related Supplies

- **1450-101 Flexible 96-well Plate Cassette** (10)
- **1450-102 Flexible 24-well Plate Cassette** (10)
- **1450-104 96-format Filtermat Cassette** (10)
- **1450-105 Rigid 96-well Plate Cassette** (10)
- **1450-106 Millipore MultiScreen Plate Cassette** (10)
- **1450-107 1/4 Betaplate Filtermat Cassette** (10)
- **1450-110 24-well Corning Plate Cassette** (10)
- **1450-109 X-talk Elimination Tube for Costar® 24-well** (24)
- **1450-111 8 x 12 Luminescence Filter Cassette** (1)
- **1450-116 4 x 6 Filtermat Cassette** (10)
- **1450-118 P-32 Filtermat Cassette** (1)
- **1450-130 384-well Plate Cassette** (10)
- **1450-216 384-well Cassette for Robot Loading System**
- **1450-217 96-well Cassette for Robot Loading System**

Tools for Filter-Based Assays

MicroBeta has excellent counting efficiency for filtermats due to its dual PMT coincidence detector setup. Unique solid scintillator MeltiLex will prevent crosstalk in receptor binding assays. Available supplies include:

- **1450-421 Filtermat A** (100)
- **1450-521 Filtermat B** (50)
- **1450-522 Filtermat DEAE** (100)
- **1450-523 Filtermat P30** (100)
- **1450-423 Nylon Membrane** (25)
- **1450-422 4 x 6 Filtermat A** (100)
- **1450-424 4 x 6 Filtermat B** (50)
- **1450-432 Sample Bag** (100)
- **1205-440 Betaplate Scint** (5 L)
- **1450-441 MeltiLex** (100)
- **1450-442 MeltiLex B/HS 14 g** (75)
- **1495-025 MeltiLex Heat Support.** For sealing flexible plates, and for convenient use of MeltiLex melt-on scintillant
- **1495-021 MicroSealer.** For sealing flexible plates, and for convenient use of MeltiLex melt-on scintillant
- **1495-023 24-well Heat Support**
- **1495-027 Filtermat Heat Sealer**
- **1495-033 MeltiLex Pipette**
- **1495-034 MeltiLex Row Pipette**
- **1495-041 Filtermat WorkStation** includes 1450-104 8 x 12 Filtermat Cassette, 1450-421 Filtermat A GF/C , 1450-432 Sample Bag, 1295-012 Bag Sealer, 1205-440 Betaplate Scint, and 1450-441 MeltiLex A

Other Supplies

- **1450-211 Conversion Kit** converts 16-plate counter to Robot Loading System
- **1450-215 Conversion Kit** converts Robot Loading System to 16-plate counter
- **1450-486 Plate Starter Kit** includes 1450-401 Flexible 96-well microplate (5 plates), 1450-402 Flexible 24-well microplate (5 plates), 1450-514 Isoplate (10 plates), 1450-461 Permanent Plateseal (20 seals) and 1450-462 Removable and Resealable Plateseal (20 seals)
- **1495-035 Filtration Plate Punch**, 8-hole (1)
- **1495-036 Filtration Plate Punch**, 96-hole (1)
- **1450-451 ID Support Plate** (100)
- **1450-452 ID Label Binder** (1)
- **1295-021 T-Tray Support** for the T-tray (special 96-well sample plate) in Betaplate
- **1295-012 Bag Heat Sealer** (1)
- **1450-461 Plateseal.** Permanent seal for microplates (100)
- **1450-462 Plateseal.** Removable and resealable (100)
- **1450-433 MultiScreen Liner**, liner to fit Millipore MultiScreen Filter into the MicroBeta
- **1450-431 Waste Bag** (100)
- **1495-032 Transport Tray** (1)
- **1450-108 Eppendorf Adaptors** (24)
- **1450-471 Normalization Standards** (1)

LSC Cocktails

Convert larger volume assays (e.g. wipe tests) to Eppendorf microtubes (up to 2 mL) or to 4 mL plastic counting vials (PerkinElmer 1200-421) and count on MicroBeta by using scintillation cocktails with high sample loading capacities that do not damage the plastic microplates. For MicroBeta, use OptiPhase SuperMix, OptiPhase HiSafe 3, or Ultima Gold™ XR.

Typical Performance Data

Liquid Scintillation Counting Efficiency

Unquenched sample with a volume of 150 mL of cocktail unpurged, in a flexible 96-well microplate (1450-401) plate.

^{3}H:	Typically 57%
^{14}C:	Typically 94%

Typical Luminescence Counting Performance

Maximum count rate in a black microplate:	24 million CPS
Background:	100 CPS
Crosstalk:	0.002%

Physical Data

Dimensions:	
Height:	630 mm (24.8 in.), except 1450-027 which is 1207 mm (40.4 in.)
Width:	700 mm (27.56 in.)
Depth:	660 mm (25.7 in.), except 1450-025 which is 785 mm (30.1 in.)
Weight:	90 kg (198.4 lb.), except 1450-027 which is 100 kg (220.5 lb.)

Electrical requirements:
Main voltage selectable 100, 115, 120, 240 V ±10%

Frequency: 50/60 Hz

Power consumption: 360 VA max

Safety, Radiated Emissions and Immunity:
The MicroBeta JET has been tested and approved for safety, radiated emissions and immunity according to the standards of CSA, TUV, IEC1010 and CE93.

In the USA the CSA approval satisfies the requirements of 29CFR 1910.399.

Please note. *PerkinElmer products are subject to continuous development. We therefore reserve the right to make changes to the specifications presented here. Limitations due to the nature of liquid scintillation and luminescence counting mean that some combinations of features are not physically possible. Some software features are not available in all operating systems. If in doubt please contact your PerkinElmer representative.*

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