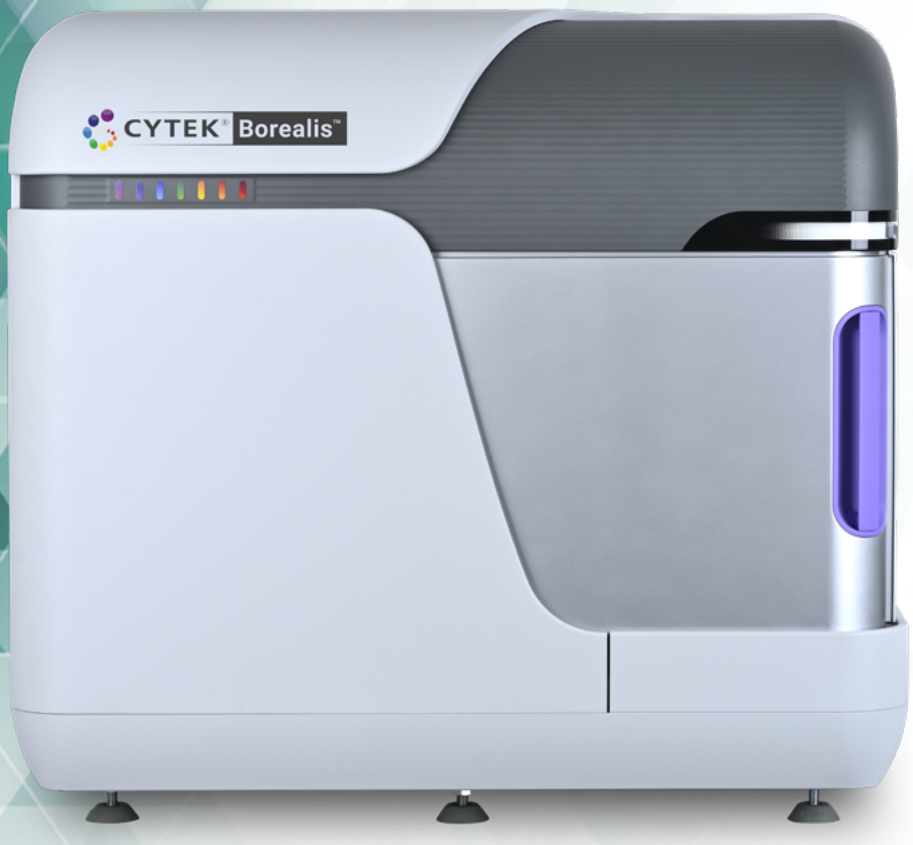
CYTEK®
TRANSCEND THE CONVENTIONAL



Cytek Borealis™ Flow Cytometer

Preliminary Technical Specifications

Technical Specifications

Optics

Excitation Optics

Optical Platform
Fixed optical assembly with the capacity to be configured with seven spatially separated laser beams

Lasers
7-Laser Configuration:
320 nm: 40 mW, 349 nm: 40 mW,
405 nm: 100 mW, 488 nm: 50 mW,
561 nm: 50 mW, 640 nm: 80 mW,
850 nm: 75 mW

Beam Geometry
Flat-top laser beam profile with narrow vertical beam height

Emission Optics

Emission Collection
Fused silica cuvette coupled to high numerical aperture (NA) lens for optimum collection efficiency to optical fibers

Forward And Side Scatter Detection
FSC: high-performance semiconductor detector with 488 nm bandpass filter

SSC: high-performance semiconductor detectors for each onboard laser. The violet (405 nm) and blue (488 nm) lasers each include a dedicated additional side scatter detector optimized for small particle detection

Fluorescence Detectors
Proprietary high sensitivity Spectrum Profile Detection Module per laser. No filter changes required for any fluorochrome excited by the onboard laser

Fluorescence Detector Configurations
Deep Ultraviolet (320 nm) detector module:
23 channels unevenly spaced bandwidth

Ultraviolet (355 nm) detector module:
23 channels unevenly spaced bandwidth

Violet (405 nm) detector module:
22 channels unevenly spaced bandwidth

Blue (488 nm) detector module:
17 channels unevenly spaced bandwidth

Yellow-Green (561 nm) detector module:
13 channels unevenly spaced bandwidth

Red (640 nm) detector module:
9 channels unevenly spaced bandwidth

Infrared (850 nm) detector module:
3 channels unevenly spaced bandwidth

Fluidics

Fluidic Modes
Dual fluidic modes: standard and high resolution

Sample Flow Rates
Standard Fluidic Mode:
Low: 15 µL/min, **Medium**: 30 µL/min,
High: 60 µL/min, **Ultra**: 100 µL/min,
Max: 200 µL/min

High Resolution Fluidics Mode:
3 µL/min

Standard Fluidic Reservoirs
4L fluid container set with real-time, active level-sensing provided. Compatible with 20L sheath and waste cubitainers

Volumetric Sensor
Volumetric measurement during sample recording with in-line flow meter, which enables calculation of counts per µL for any gated population without the need for counting beads. Automated flow meter QC is available to confirm proper operational status

Performance

Carryover
≤ 0.1% in manual tube mode

Data Acquisition Rate
Up to 30,000 events/sec*

*Requiring abort rate ≤ 10% of event rate

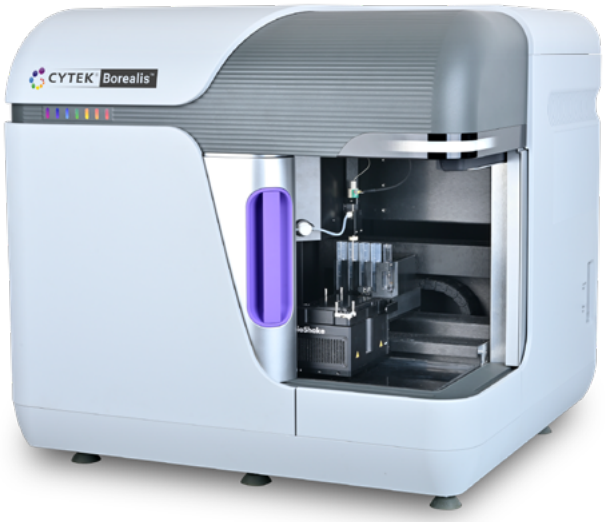
Fluorescence Performance

Fluorescence Linearity
FITC $R^2 \geq 0.995$ / PE $R^2 \geq 0.995$

Scatter Performance

Forward Scatter Resolution
Performance is optimized for proportionally resolving lymphocytes, monocytes, and granulocytes reflecting their relative size

Side Scatter Resolution
Large dynamic range of scatter resolution using dual standard violet SSC and blue SSC detectors along with high-sensitivity violet and blue SSC detectors capable of resolving small particles down to 50 nm polystyrene beads



Functional Specifications

Plate Loader

High-Throughput Speed
24 min* for 96-well plate

*Data averaged from multiple systems. Run in high-throughput mode (no agitation, no SIT flush) with 2 sec/well stopping criteria

Plate Loader Temperature Control
4–37°C (39.2–98.6°F)

Input Compatibility
96-well plate, 96-well deep well plate, 40-tube rack (12 x 75 mm)

Plate Loader Carryover
Default Mode: ≤ 0.3%
Low Carryover Mode: ≤ 0.1%

Software

SpectroFlo® Software

Developed with multicolor assays in mind

Streamlined workflows for experiment setup, data acquisition, and file export

Conventional compensation and spectral unmixing capabilities

Automated QC module

Live unmixing of samples during acquisition

Autofluorescence extraction and multiple signature autofluorescence explorer

FCS 3.1 data file standard

Automated, scheduled instrument startup and shutdown

Automatic bubble and clog detection

API for integration with robotics platforms and scheduling software

Electronics

Signal Processing
Digital signal processing with automatic window gate adjustment

22-bit 6.5 log decades

Threshold using any single parameter or combination of parameters

Pulse Shape Parameters
Pulse area and height for every parameter. Width for scatter parameters and one fluorescence parameter for each laser

Workstation

Computer Specifications
Operating System: Windows® 11 Pro 64-bit

Processor
Intel® Core™ i5-13500 processor or equivalent

RAM
64 GB

Hard Drive
1 TB SSD and 2 TB SSD (secondary)

Monitor
32" UHD 4K monitor

Installation Requirements
Dimensions (W x D x H)

Instrument Dimensions
78 x 69 x 72.5 cm (30.5 x 27 x 28.5 in)

Instrument Weight
122.5 kg (270 lb)

Room Requirements

Power
100–140 VAC, 15A or 200–250 VAC, 10A

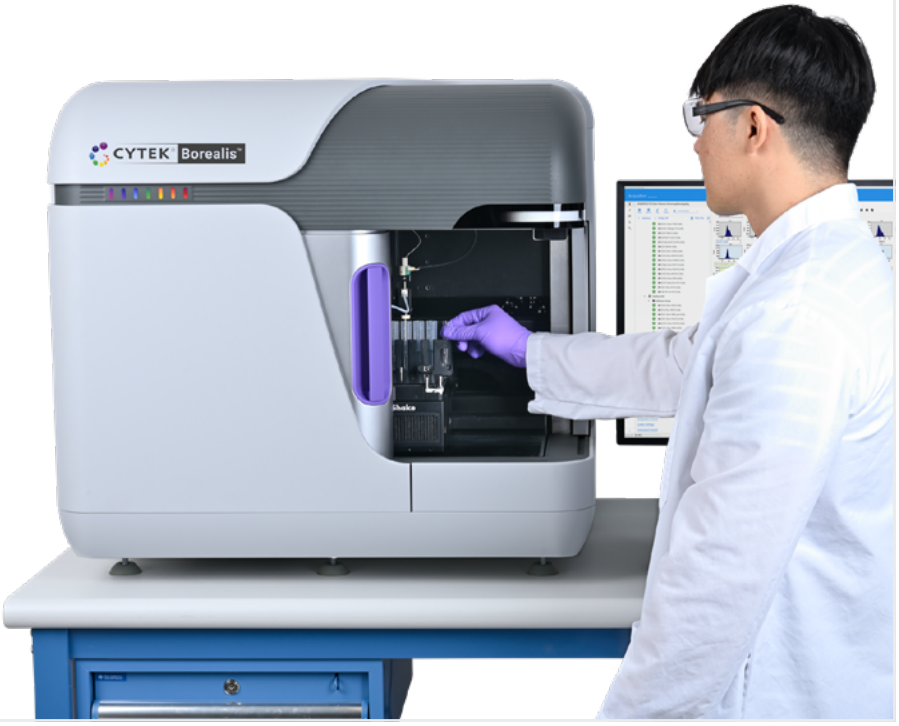
Heat Dissipation
800 W with all solid-state lasers

Air Filtering
No excessive dust or smoke

Lighting
No special requirements

Regulatory Status

Class 1 laser product.
For research use only. Not for use in diagnostic or therapeutic procedures



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This document reports preliminary technical specifications, final technical specifications will be confirmed upon completion of verification testing.

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