

# CyFlow<sup>®</sup> Ploidy Analyser & CyFlow<sup>®</sup> Space

## High-resolution DNA analysis

For agrosience · breeding · aquaculture



CyFlow<sup>®</sup> Ploidy Analyser

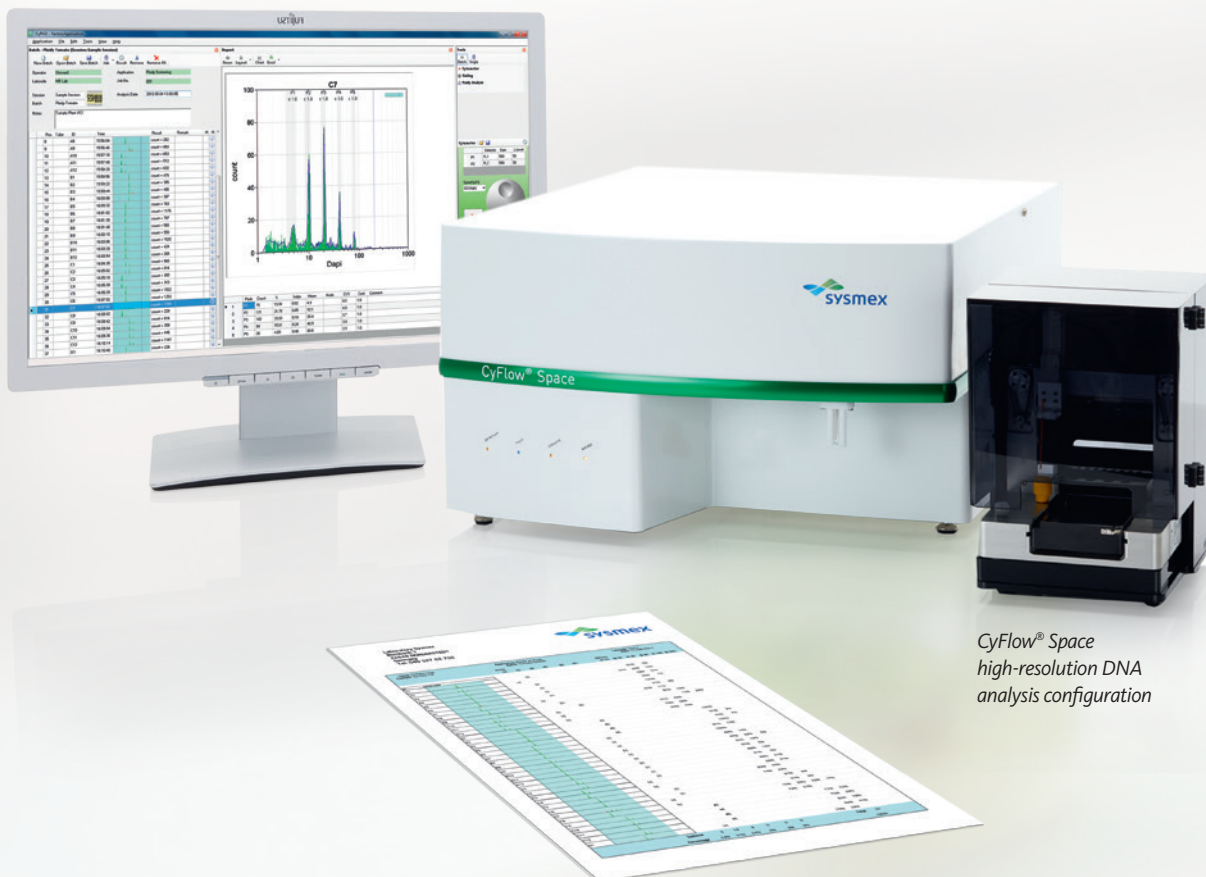
CyFlow<sup>®</sup> Space

# Dedicated solutions for ploidy analysis and determining genome size

Determining ploidy is a particularly important form of analysis in plant breeding and aquaculture: controlling the ploidy level is often essential for monitoring the outcome of breeding procedures and quality in seed and plant production.

As such, accurately determining genome size and ploidy levels plays a major role in today's evolutionary biology, taxonomy and ecology. It helps to characterise and understand how species develop and the details of population structures.

Counting chromosomes by classical light microscopy has been replaced by flow cytometry, i.e. determining fluorescently labelled nuclei and their analysis in a flow cytometer. This method is time and cost-saving as it provides precise results quickly with an efficient and validated workflow.



*CyFlow® Space  
high-resolution DNA  
analysis configuration*

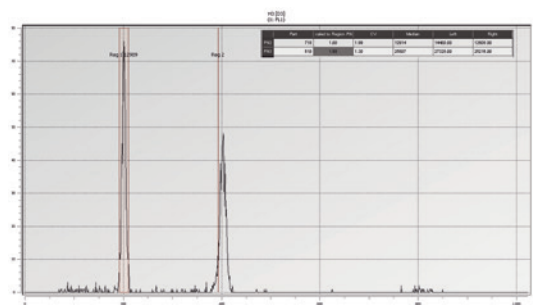
*Example of a  
DNA analysis report*

“ Flow cytometry is the state-of-the-art method in the breeding industry and in research for determining both the ploidy level and genome size in plants, animals and microorganisms. ”

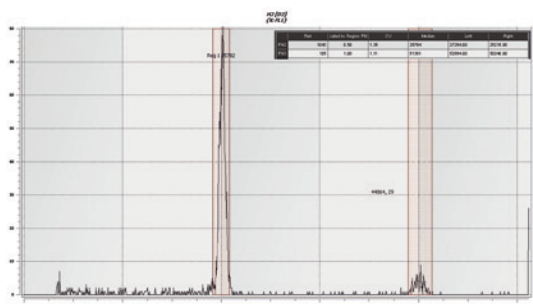


Based on the proof of concept of its predecessors in industry and research, Sysmex is proud to offer you an up-to-date flow cytometry solution with its third-generation CyFlow® Ploidy Analyser (CyFlow® PA) and CyFlow® Space DNA analysis configurations.

- Determining genome size requires stoichiometric DNA labelling and lowest coefficients of variation in DNA quantification. The CyFlow® PA and CyFlow® Space use a 532 nm laser and the DNA fluorochrome propidium iodide, which produces superior results for genome size analysis compared to standard flow cytometers using lasers of 488 nm.
- Due to its superb high-resolution DNA histograms and its ease of use, the fluorescent dye DAPI is the most powerful, fast and economic solution for analysing ploidy level and detecting aneuploidy. Sysmex Partec's unique UV LED (365 nm) is the optimal light source to fully exploit this fluorochrome's features.



*Zea mays, 2n – diploid, CyStain® DAPI staining*



*Zea mays, 4n – tetraploid, CyStain® DAPI staining*

The CyFlow® PA and CyFlow® Space provide ploidy and genome size analysis in less than two minutes. These instruments are available in the following three versions: for the analysis of samples stained with (1) DAPI, (2) PI or (3) DAPI and PI.

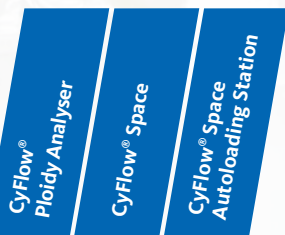
For higher throughput, you can equip the CyFlow® Space system with an Autoloading Station that accepts 96-well plates as a single load. Samples preparation is easy, quick and cost-effective thanks to Sysmex's ready-to-use staining reagents and protocols.





## Choose your instrument based on your needs

Sysmex offers a range of solutions to meet your particular needs. From a compact device to large solutions, you choose your cost-benefit ratio. For more details, see the table below.



DNA Analysers		Comments	
<b>Small footprint solution</b>	✓		<ul style="list-style-type: none"> <li>■ Compact 18 kilograms dedicated solution with peak analysis functions.</li> <li>■ Reports via FCS Express software.</li> </ul>
<b>Upgradable solution for further research assays</b>		✓	<ul style="list-style-type: none"> <li>■ Peak analysis functions and reporting.</li> <li>■ Blue laser and parameters could be added for pollen viability or other plant biology research applications.</li> <li>■ Cell and nuclei sorting by an optional piezo-electric cell and particle sorter.</li> </ul>
<b>Unique high-throughput solution for ploidy analysis screening</b>			<ul style="list-style-type: none"> <li>■ 96-well plate screening analysis in 15 minutes (30 min with cleaning step).</li> <li>■ High-throughput CyPAD® software solution for ploidy and aneuploidy analysis and reporting.</li> <li>■ Predefined automation settings.</li> </ul>

**Table 1** DNA analysis solutions comparison in a nutshell



## Easy sample preparation

We offer a range of different reagent kits to control and prepare your samples for flow cytometry analysis on your CyFlow® PA or CyFlow® Space. The reagent kits include ready for use staining solutions and nuclei extraction for analysing absolute or relative genome size variation and ploidy level of plant cells and cells of different origin (e.g. leaf and root tissue, seed, *in vitro* material). The staining can be applied to various biological tissue specimens. 30 or 50 µm mesh CellTrics® cell strainers support efficient cell nuclei isolation from tissue debris. This simple CellTrics® filtering step delivers a homogeneous cell nuclei suspension.



*CyStain® PI Absolute T reagent kit*

Order-No.	Reagents	Dye
05-5001	CyStain® UV Ploidy	DAPI
05-5002	CyStain® UV Precise P	DAPI
05-5002-a	CyStain® UV Precise P automate	DAPI
05-5003	CyStain® UV Precise T	DAPI
05-5003-a	CyStain® UV Precise T automate	DAPI
05-5022	CyStain® PI Absolute P	PI
05-5023	CyStain® PI Absolute T	PI
05-7302	DNA Control UV	DAPI
05-7303	DNA Control PI	PI

# Technical specifications

## Instrument models and light sources

Model	Light source(s)
CyFlow® PA or CyFlow® Space DAPI	■ UV LED (365 nm)
CyFlow® PA or CyFlow® Space PI	■ green laser (532 nm, 30 mW)
CyFlow® PA (2 parameters) or CyFlow® Space (3 parameters) DAPI + PI	■ UV LED (365 nm) ■ green laser (532 nm, 30 mW)

	Ploidy Analyser	CyFlow® Space
<b>Optics</b>	1 or 2 optical parameters with selected photomultiplier tubes (PMT); Standard set-up and filters for propidium iodide (PI) and/or DAPI/SSC	3 standard set-up and filters for propidium iodide (PI) and/or DAPI/SSC; Flexible choice of up to 3 light sources (optional integrated sorter); Modular optical system with up to 8 optical parameters with selected PMTs; Exchangeable optical filters
<b>Flow system</b>	Quartz flow cuvette for laminar sample transport and hydrodynamic focusing; Sample port with biosafety cleaning function; True Volumetric Absolute Counting (TVAC) based on mechanical volume measurement; Computer-controlled syringe pump speed, adjustable to 20 µL/s; Fluid and waste reservoirs with fluid level sensors	Quartz flow cuvette for laminar sample transport and hydrodynamic focusing; Sample port with biosafety cleaning function; True Volumetric Absolute Counting (TVAC) based on mechanical volume measurement; Computer-controlled syringe pump speed, adjustable from 0 to 20 µL/s; Fluid and waste reservoirs with fluid level sensors
<b>Electronics and signal processing</b>	Selectable linear or 4-decade logarithmic scale; 16-bit analogue-to-digital converters; Selectable trigger parameter and individual threshold level settings	Selectable linear, 3-decade or 4-decade logarithmic scale; 16-bit analogue-to-digital converters; Selectable trigger parameter and individual threshold level settings
<b>Software</b>	Operating system: Microsoft Windows™; CyView® operating software for real-time data acquisition, display and analysis; Data format: flow cytometry standard (FCS)	Operating system: Microsoft Windows™ with Microsoft Office® FloMax® operating software for real-time data acquisition, display, analysis and reporting; Data format: flow cytometry standard (FCS)
<b>Computer system</b>	Integrated Microsoft Windows™ PC; Integrated, foldable 15" colour LCD TFT display; Ethernet and USB ports; Optional colour printer; Optional external screen (dual screen mode)	Latest industry standard Windows™ PC; Microsoft Windows™ professional operating system; 22" colour LCD TFT display; DVD-RW, USB and Ethernet ports; Optional colour printer; Optional external screen (dual screen mode)
<b>Options</b>		CyFlow® Space sorter module CyFlow® Space Autoloading Station with CyPad software
<b>Weight</b>	18 kg; with Autoloading Station 30 kg	37 kg; with Autoloading Station 43 kg
<b>Dimensions</b> (W x H x D)	385 x 290 x 280 mm; with open display 528 mm height	560 x 300 x 650 mm; with Autoloading Station 910 mm width

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