



GENOTYPING

Target Selection to Production Scale



THE NO-COMPROMISE GENOTYPING SOLUTION

- **Superior performance and data quality**—99.9% genotyping call rate is the highest available
- **Fast, walkaway workflow**—9,216 genotypes in 2.5 hours with only 20 minutes of hands-on time
- **Fully integrated and ready to scale**—a complete platform supports your high-throughput workflow from target validation through pilot testing and deployment

The Fluidigm® no-compromise genotyping solution delivers the highest-quality data and massive throughput, all in record time. Our 99.9% call rate is the best available in the industry, yet with only 20 minutes of hands-on time, you can easily speed through over 9,000 genotypes in less than four hours.

Your demands have intensified. As more genetic markers are identified and used to assess disease risk or selectively breed for positive traits, you need high sample throughput, ultrahigh data quality, assay flexibility, and an easy workflow. Other platforms force you to compromise and make hard choices involving poor data quality, cumbersome workflows, lack of flexibility, or high cost. Now you can have everything you need in one easy solution.

From personal genomics research, GMO quantitation, and marker-assisted selection, to wildlife tracking, livestock breeding, and biobank sample tracking, Fluidigm offers you a high-quality solution with no compromise.

Genotyping Solutions From Fluidigm— No Compromise

The Fluidigm genotyping solution combines integrated fluidic circuit (IFC) technology with optimized instruments and robust allele-specific assays that deliver thousands of ultrahigh quality datapoints much faster, more cost-effectively and more reliably than traditional plate-based or mass spectrometry based genotyping platforms.

The Ease of IFCs

Integrated fluidic circuits (IFCs) use a network of microfluidic channels, valves, and chambers with a controller to automatically assemble as many as 9,216 individual uniplex PCR reactions. This decreases the number of manual pipetting steps needed, and minimizes errors and variability. IFCs require 99.5% less master mix while generating 24 times more data in a single day than 384-well plate systems.

The setup of 9,216 PCR reactions requires as little as 24 pipetting steps. Simply transfer DNA samples and SNP Type™ assays onto the IFC, and insert it into the Juno System, which automates reaction mixing and thermal cycling. Once PCR is completed, IFC is read in a Biomark™ HD or EP1™ system. In less than five minutes, genotypes are called automatically and are ready to be analyzed in the Fluidigm SNP Genotyping Analysis software. It takes only 20 minutes of total hands-on time to complete the whole process.

TABLE 1

	48.48	192.24	96.96	Juno 96.96
Samples	48	192	96	96
Assays	48	24	96	96
Genotypes per IFC	2,304	4,608	9,216	9,216

KEEPING UP WITH EXPANDING APPLICATIONS

The use of SNP genotyping is accelerating throughout a wide range of scientific and commercial areas, from agriculture to wildlife management to disease identification and drug discovery. Some of the applications already incorporating Fluidigm genotyping systems include:

- Personal genomics research and pharmacogenomics
- Marker-assisted breeding and genetic tracking of livestock
- Adventitious GMO detection and quantitation
- Marker-assisted selection of high-value crops
- Fisheries management and wildlife species tracking
- Genetic identification and quality control for biorepositories and service labs

Maximum Applicability: Biomark HD

The Biomark HD system sets a new standard in high-throughput genotyping—it is the only multipurpose real-time PCR system that performs genotyping, gene signature profiling, quantitative real-time digital PCR (qdPCR), and single-cell analysis. Its integrated fast-capable thermal cycler and four-color detection provides even faster time to results and enough throughput for routine genomic testing applications.

WHAT CAN YOU DO WITH A BIOMARK HD IN A DAY?

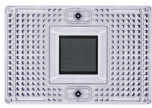
- Use qdPCR in the Biomark HD to quantify rare event mutations in 48 samples simultaneously, and use the real-time PCR data to validate positive results,
- Use the real-time PCR function to profile a 96-gene signature panel against 96 samples at once, then
- Finally, use the fast-capable thermal cycler with the end-point mode to genotype 192 samples against a panel of 24 SNP markers.

Biomark HD streamlines work for applications that demand sensitivity and dynamic range at extremely high throughput.

EASY WORKFLOW WITH THE BIOMARK HD SYSTEM

1

Pipet samples and SNP Type assays onto the IFC.



2

Place the IFC into the Juno system to automatically set up and PCR the samples and assays.



3

Collect data on the Biomark HD system.

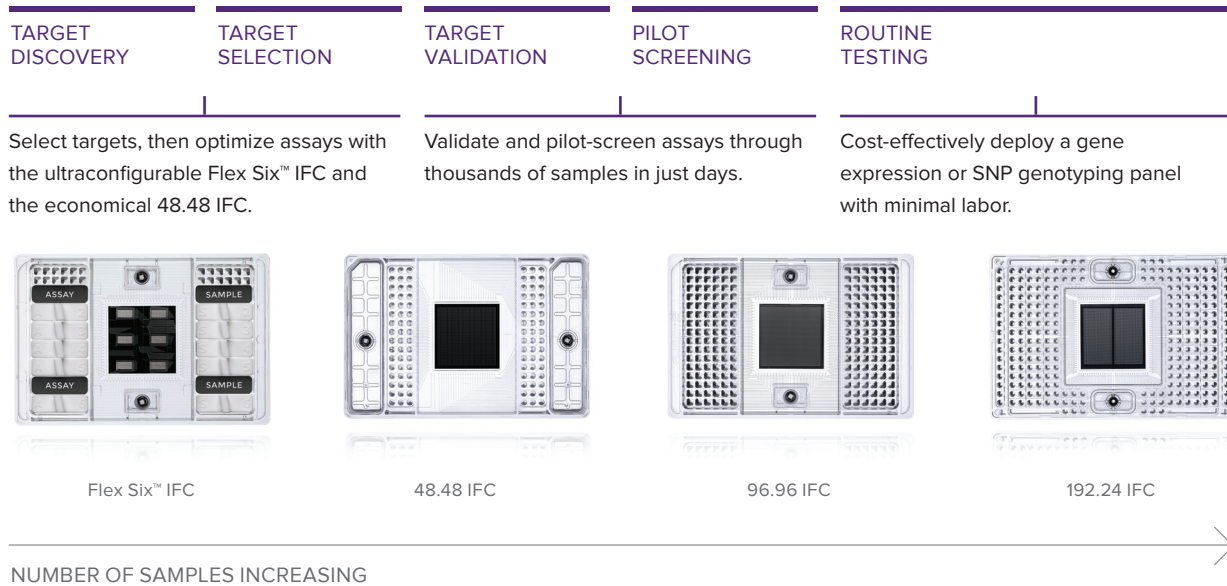


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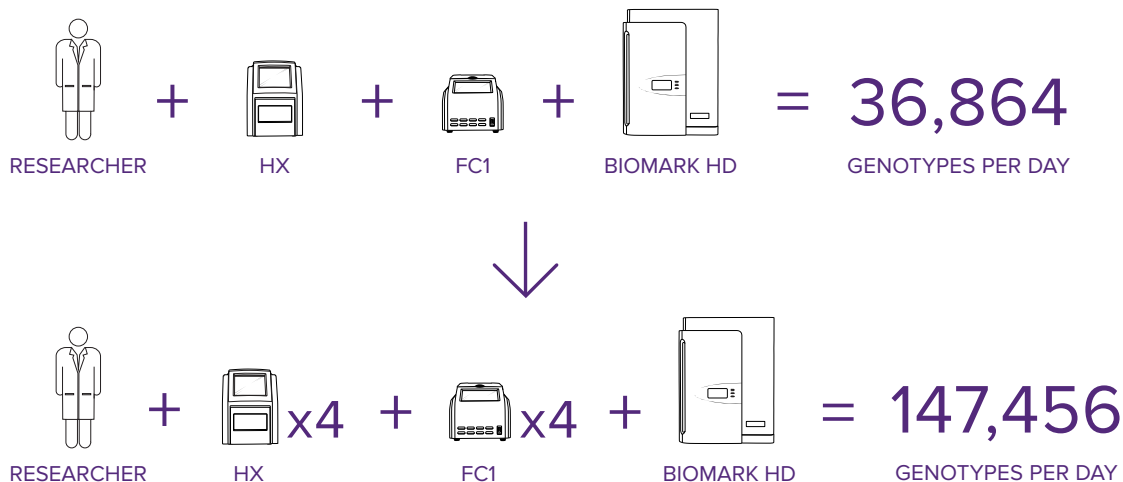
View and analyze results with the data analysis suite.



Finally, Affordable Scale-up



With other platforms, scaling up means moving from tubes to plates to arrays. Each new format requires costly and time-consuming revalidation and bridging studies. Moving from target selection to production is easier and less costly using Fluidigm genotyping solutions because IFCs are flexible enough to accommodate low-throughput work during the target selection and process validation phases and more samples during pilot testing. Once you are ready to deploy, you can still use IFCs and the same assays and reagents. There is no need to revalidate as you move into production. Doubling your capacity in production is as easy as adding another IFC Controller and FC1™ Cyclers. No need to buy another complete system; just combine the additional components with your existing Biomark HD System or EP1 System to go from a daily sample throughput of 384 samples to as much as 1,536 samples with only one technician.



SCALE UP TO THE INDUSTRY'S MOST STREAMLINED PCR WORKFLOW—THE EP1 SYSTEM

More affordable and with a lower upfront investment, the EP1 is uniquely suited for laboratories starting up their genotyping services. Start with a single EP1 during the marker selection, validation, and pilot testing phases before launch. Once materials and processes are optimized and validated, add modular components for added capacity as needed without a large capital outlay.

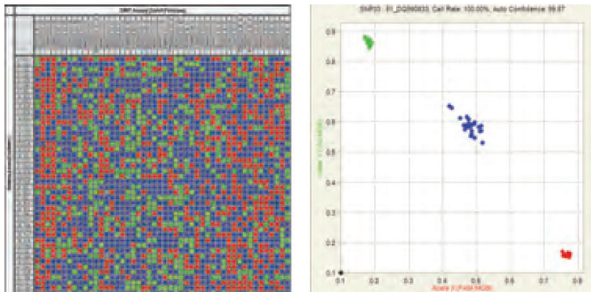
The EP1 system, which consists of the IFC controller, FC1 cycler and EP1 reader, is the most cost-effective and streamlined end-point PCR workflow in the industry—you get outstanding results in hours, not days.

Custom Assays Using a Proven Design Pipeline

SNP Type assays provide high-throughput, low-cost genotyping for rapid assay design and screening for SNPs. These assays are:

- Designed for any species with your supplied sequences
- Validated with preamplification protocols to boost results from low-quality, low-concentration or precious samples
- Demonstrated to be concordant to TaqMan® SNP assays

Since high oligonucleotide synthesis costs are due to the fluorophore and quencher moieties of dual-labeled probes and their HPLC purification, SNP Type assays, comprised of unlabeled allele-specific primers and universal probes, are more affordable than TaqMan assays. Because SNP Type assays are affordable, you can design and test assays for multiple markers, and choose the best one empirically. Selecting the optimal assay for deployment into production has never been so cost-effective and easy.



Call map view for 48 cattle samples and 48 SNP Type assays (left); cluster plot for a typical SNP Type assay (right).

1

CUSTOMER
SUBMITS
SEQUENCES

2

FLUIDIGM DESIGNS
SNP TYPE ASSAYS

3

CUSTOMER
REVIEWS AND
APPROVES
ASSAY DESIGN

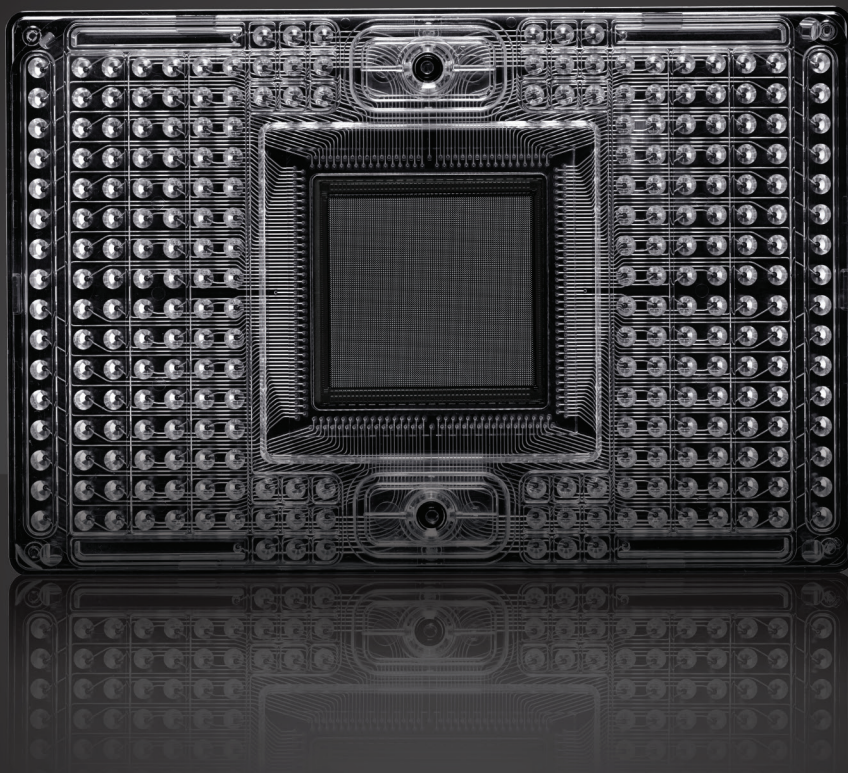
4

FLUIDIGM DELIVERS
ASSAYS AND
SEQUENCES TO
THE CUSTOMER

Outstanding Quality

The combination of Fluidigm IFC technology that automatically assembles reactions with little manual work and reliable instruments and reagents produces highly uniform data that can be counted on in routine genotyping laboratories. Feel confident that your investment is supported by a world-class team of field service engineers and highly trained technical support representatives. Preventive maintenance programs and installation qualification ensure compliance with Good Laboratory Practice requirements.

With the growing range of applications in routine genotyping, the need for high-throughput, precise, and affordable results is now at a critical point. Fluidigm provides robust genotyping solutions that give you outstanding data quality with less work and with the flexibility to adapt to more commercial applications, all without compromise. Find out how at [fluidigm.com](https://www.fluidigm.com).



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