

Seq-Ready™ TE MultiSample Custom DNA Panels Flexible Designs, Superior Coverage

With the Seq-Ready™ TE MultiSample Custom DNA Panels, researchers can design custom targeted resequencing panels with the highest coverage and design flexibility with rapid turnaround. Powered by the SmartChip™ massively-parallel singleplex PCR technology, Seq-Ready™ TE is an affordable and simple one-step target enrichment and library preparation solution that delivers excellent sequencing coverage for easy implementation in clinical research labs.

Unlike traditional multiplex PCR assay designs that often require multiple rounds of highly empirical optimization and careful primer pooling, the SmartChip™ TE singleplex PCR technology uses a straightforward primer design pipeline, thereby accelerating the assay development and implementation.

"We were able to achieve a very high degree of coverage uniformity and sample-to-sample reproducibility, which is of critical importance for clinical applications that we are developing in our service and product portfolio."

— Dr. Xun Xu, Deputy Director and VP of R&D, BGI

Workflow for Clinical Research Labs

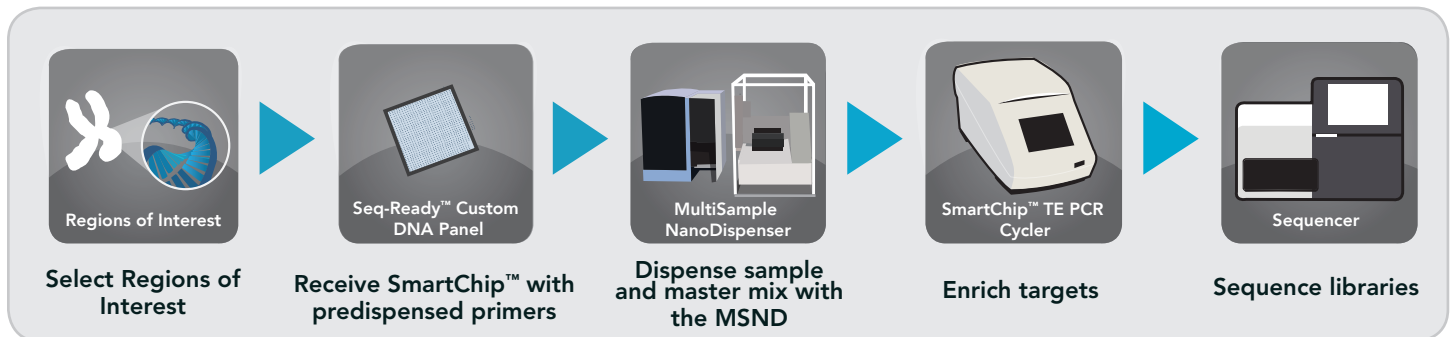


Figure 1. Streamlined workflow for clinical research laboratories. This plug-and-play workflow eliminates user error and frees the scientist for other important tasks.

SmartChip™ Technology for Massively-Parallel Singleplex PCR

Seq-Ready™ TE panels, powered by the SmartChip™ technology, take advantage of massively-parallel, singleplex PCR to simultaneously enrich a large number of target regions and incorporate sequencing adapters and barcodes to produce sequencing-ready libraries in one simple step. Unlike singleplex PCR, multiplex PCR reactions are subject to primer-primer interaction and inhibition, which can result in decreased target coverage due to amplicon dropouts. Without the concerns of primer competition, singleplex PCR yields higher coverage, which can result in more confident variant calling. This minimizes the need for orthogonal testing ("gap filling") using Sanger sequencing, saving additional reagents, time and labor.

Seq-Ready™ TE MultiSample Custom DNA Panel Features

- >99% typical *in silico* design coverage
- 95% conversion rates
- Excellent sequencing coverage and coverage uniformity
- Highest flexible panel design and user-selectable configurations
- Streamlined workflow for high-throughput target enrichment and library preparation in one simple step

Ultimate Design Flexibility

The Seq-Ready™ TE MultiSample Custom DNA Panel enables researchers to analyze hundreds of genes covering up to 2.5 Mb of cumulative sequence with ultimate flexibility. Researchers select the sequencing platform, amplicon length, and send coordinates for genomic regions of interest (Figure 2). An *in silico* design coverage report is then returned to the researcher for review. We typically provide 90% coverage of primer pair sequences at >1X sequencing coverage using high quality control DNA.

The SmartChip™ MultiSample NanoDispenser permits a highly flexible assay configuration based on experimental requirements. For small panel optimization experiments requiring a few samples, assays and samples can be dispensed in your lab using the Seq-Ready™ FLEX™ protocol (Table 1). For validated panels, WaferGen can pre-dispense the assays into chips and ship them as pre-dispensed Seq-Ready™ TE MultiSample Custom DNA Panels. Researchers have the flexibility to choose the number of assays and samples for their custom design panel (Table 2). For clinical sequencing, 100% coverage can be obtained with a rapid panel iteration. With singleplex PCR assays, content from one panel can be easily moved to other panels without affecting assay quality.

Seq-Ready™ FLEX Panel Configurations

Max. Assay #	Samples	Max. Assay #	Samples
12	384	96	54
24	216	120	42
36	144	144	36
48	108	216	24
54	96	248	20
72	72	296	16
80	64	384	12

Table 1. SmartChip™ MultiSample NanoDispenser permits a highly flexible assay configuration based on experimental requirements.

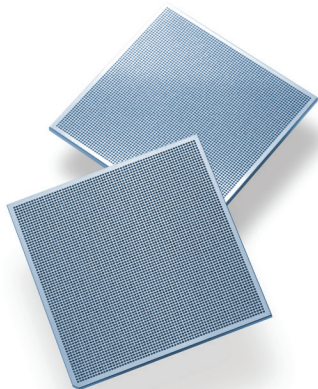
Custom DNA Panels Configurations

Max. Assay #	Samples	Max. Assay #	Samples
48	96	432	12
72	72	648	8
96	54	864	6
108	48	1296	4
216	24	2592	2
288	18	5184	1
360	14	–	–

Table 2. SmartChip™ MultiSample NanoDispenser permits a highly flexible assay configuration based on experimental requirements.



Figure 2. Seq-Ready™ TE Custom Workflow



Designed for Optimal Coverage of Critical Regions

The Seq-Ready™ singleplex design pipeline avoids tradeoffs between high coverage and off-target enrichment, eliminating the need for lengthy primer redesign, thereby accelerating assay development and implementation. Seq-Ready™ TE MultiSample Custom DNA Panels result in higher first time *in silico* design (typically > 99% of all ROI) and higher amplicon conversion rates (typically > 95%). Amplicons are designed to span beyond the targeted coding exon and exon-intron boundaries to ensure that the regions of interest are sequenced. Amplicons overlap to reduce the chance of false-negatives due to rare variants and polymorphisms. To reduce the possibility of dropouts, no SNPs with frequency >0.5% are included in the first 10 nucleotides of the 3' end of primers. Primer redundancy allows for maximum coverage in SNP dense regions.

Seq-Ready™ TE Workflow: One-Step Target Enrichment and Library Prep

Target enrichment workflows based on hybrid capture or multiplexed PCR are long, difficult and labor intensive, making them a challenge to integrate into clinical research labs. The Seq-Ready™ TE ligation-free workflow simultaneously enriches target regions and incorporates sequencing adapters and barcodes to produce sequencing-ready libraries in one simple step (Figure 3). An operator can complete the streamlined workflow in less than 4 hours, with less than 45 minutes of hands-on time.

Seq-Ready™ TE Workflow Advantages

- One step target enrichment and library preparation
- Ligation-free workflow saves valuable labor, reagents and time
- No post-enrichment amplification required, saving reagents
- No sample-to-sample normalization required
- Minimal hands-on time (as little as 45 min.)
- Up to 96 barcoded samples per sequencing run

Precision Nanoliter Dispense with the SmartChip™ MultiSample NanoDispenser

The SmartChip™ MultiSample NanoDispenser (MSND) is a high-precision, nanoliter volume liquid handling system customized with a chip cooling station and an enclosed humidification environment for delivering multiple samples onto the nanowells of a SmartChip™. The SmartChip™ MSND provides high precision, non-contact dispensing based on advances in solenoid valves and flow path technology for accurate dispense of sample mastermix into the nanowells of the SmartChip™.

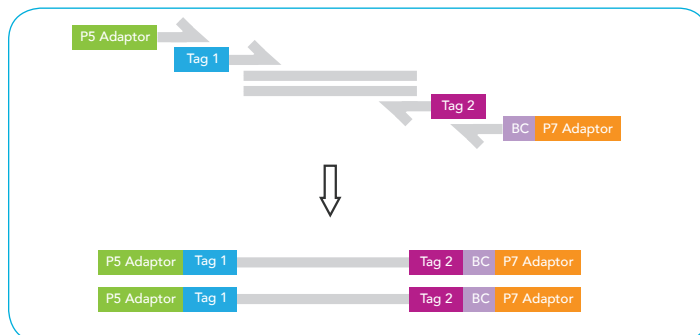


Figure 3. Nested primer sets simultaneously enrich a large number of target regions and incorporate sequencing adapters and barcodes to produce sequencing ready libraries in one step.

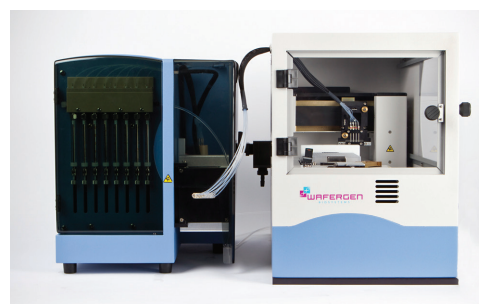


Figure 4. SmartChip™ MultiSample NanoDispenser (MSND)

SmartChip™ MultiSample NanoDispenser	
Maximum # of samples	384
Dispense volume	50 or 100 nL per Well
Laptop Computer	Enterprise class, 64-bit Windows 7 2 Gb memory, 250 Gb storage 1 Gb network and wireless, USB
Power Requirements	100-120VAC/200-240VAC, 8A/4A at 47-63 Hz Two outlets (Cycler, CPU+Monitor)
Environmental Conditions	15-30°C Ambient 10-70% Relative Humidity, non-condensing
Dimensions (W) x (H) x (D)	Fluidic Module: 28 cm, 33 cm, 45 cm Pump Control Box: 26 cm, 38 cm, 51 cm Stage Module: 27 cm, 40 cm, 60 cm Humidifier: 20 cm, 40 cm, 30 cm Scale: 25 cm, 50 cm, 22 cm Laptop Computer: 35 cm, 30 cm, 27 cm
Weight	Multisample dispenser: 65 kg, CPU: 2.7 kg
Dispenser Run time	48 samples <10 minutes, 96 samples, <20 minutes 384 samples < 60 minutes
Certifications	TUV (North America), CE Mark (European Union)

Seq-Ready™ TE Custom DNA Product Description	
Panel Size	Up to 2.5 Mb of cumulative genomic regions
Species	Human
Genomic Coordinates	<ul style="list-style-type: none"> • HUGO gene symbol • RefSeq • Ensemble gene and transcript IDs
Amplicon size	User selectable (150 - 600 bp) <ul style="list-style-type: none"> • FFPE: 150-200 bp • ILMN: 300-600 bp (2 x 300 bp)
In-silico design rate	Observed > 99%
Assay conversion rate	Observed > 95%
DNA input	As low as 25 ng per sample
Replicate assays	To increase the depth of coverage for a specific ROI a user may increase replicate primer-pair dispensing on to a SmartChip™ (e.g. duplicate, triplicate, etc.)
Time-to-results	3 hrs 45 min (DNA to sequencing-ready libraries)
Samples per chip	Up to 96

Ordering Information

Part Number	Product Name	Description
Seq-Ready™ TE MultiSample Custom DNA Panels		
440-000053	Seq-Ready™ TE MultiSample Custom DNA Panel	Includes: <ul style="list-style-type: none"> • Seq-Ready™ TE SmartChip™ predisposed with Seq-Ready™ TE Custom Primers • Seq-Ready™ TE Loading Kit • TE Collection Kit
440-000054	Seq-Ready™ TE Custom DNA Primers	The Seq-Ready™ TE design pipeline supports custom designs of up to 2.5 Mb of cumulative genomic regions of interest (125 bp-600 bp amplicons).
430-000138	Seq-Ready™ TE MultiSample Reagent Kit 1-24 (ILMN)	Includes: <ul style="list-style-type: none"> • Seq-Ready™ TE Master Mix • Seq-Ready™ TE Universal Primer • Illumina-compatible indices • Illumina-compatible sequencing primers Enough reagents are supplied for 4 Seq-Ready™ TE SmartChips™ (PN: 430-000103)
430-000139	Seq-Ready™ TE MultiSample Reagent Kit 25-48 (ILMN)	
430-000140	Seq-Ready™ TE MultiSample Reagent Kit 49-72 (ILMN)	
430-000141	Seq-Ready™ TE MultiSample Reagent Kit 73-96 (ILMN)	
Seq-Ready™ TE MultiSample FLEX Panels		
430-000199	Seq-Ready™ TE MultiSample FLEX Kit	Includes SmartChip and consumables necessary to run chip for or Target Enrichment Protocols <ul style="list-style-type: none"> • Seq-Ready™ TE FLEX Loading Kit • TE Collection Kit
430-000220	Seq-Ready™ TE MultiSample FLEX Reagent Kit 1-24 (ILMN)	Includes: <ul style="list-style-type: none"> • Seq-Ready™ TE Master Mix • Seq-Ready™ TE Universal Primer • Illumina-compatible indices • Illumina-compatible sequencing primers Enough reagents are supplied for 4 Seq-Ready™ TE FLEX™ SmartChips™ (PN: 430-000199)
430-000221	Seq-Ready™ TE MultiSample FLEX Reagent Kit 25-48 (ILMN)	
430-000222	Seq-Ready™ TE MultiSample FLEX Reagent Kit 49-72 (ILMN)	
430-000223	Seq-Ready™ TE MultiSample FLEX Reagent Kit 73-96 (ILMN)	
System Requirements		
420-000029	Seq-Ready™ MultiSample System	Includes: <ul style="list-style-type: none"> • MultiSample NanoDispenser • Centrifuge adapter (pair) • 2 SmartChip TE PCR Cyclers
Optional Systems		
420-000006	SmartChip™ Real-Time PCR Cycler	System hardware to enable quality control of target enriched libraries prior to sequencing.
Services		
440-000055	Seq-Ready™ TE Custom DNA Panel Sequencing Verification	WaferGen will prepare the Seq-Ready™ TE MultiSample Custom DNA libraries and sequence on a MiSeq™ using a 2 X 150bp or 2 X 300bp sequencing kit. Unless otherwise specified, an NA012878 sample will be sequenced. A performance summary report of the individual assays (amplicons) aligned to the Human reference genome (hg 19) is provided. Performance typically observed is > 90% coverage of primer pairs sequences at > 1X coverage.

To place an order please contact us:

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Enabling clinical sequencing through complete coverage

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