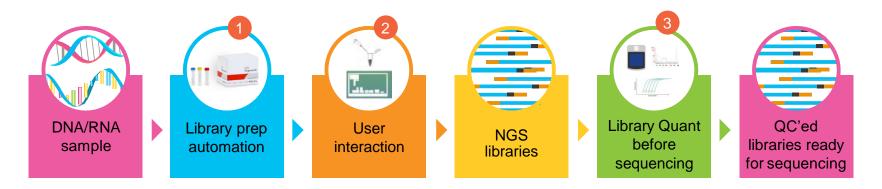


Challenges in current NGS library preparation and quantification workflow



- Complicated workflow validating kits on existing automation platform
- PROBLEN Increased variability due to manual interaction for automated prep
 - Time consuming and expensive library quant with sample loss

DreamPrep NGS featuring Tecan Genomics NGS library preps

- Full walk-away solution allowing two library preps in a day DNA-seq libraries quantified, normalized and ready to sequence in less than 4 hours.
- NuQuant technology for integrated library QC in less than 6 min with No sample loss
 Measure 96 samples simultaneously in the final plate without sample transfer.
- User friendly interface & system performance monitoring Intuitive touchscreen operation to reduce operator training.
 Introspect software is tracking your system productivity, incl. runtime, consumable usage and error rates.

TECAN IS YOUR SINGLE POINT OF CONTACT FOR NGS Automation, Tecan's reagents, consumables, application support, troubleshooting & service DreamPrep NGS offers unprecedented speed and accuracy for automated library preparation and quantification with Tecan Genomics reagents.





DreamPrep NGS brings you to a superior level of automation

Single point of contact for automation & reagents

OPTIMIZED

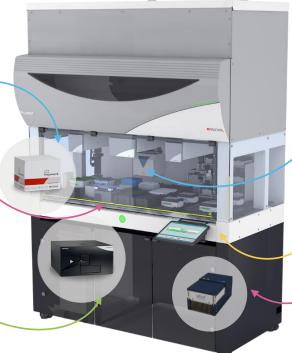
for Tecan NGS library preparation kits#

Optimal performance of reagents with samples **THERMAL DEVICES** and shaker+

Library QC in less than 6 min without sample loss

INTEGRATED **PLATE READER** for full walk away QC and

normalization /



3 ARMS

for increased speed and flexibility

Individual well and full plate manipulation for optimal speed

TOUCH SCREEN For intuitive

operations

User friendly interface to reduce user training

THERMAL CYCLER INCLUDED

for longer walk away times

Walk-away solution with minimal manual interaction

+ CPACs, Thermoshake and ODTC manufactured by Inheco Industrial Heating and Cooling GmbH. Martinsried, Germany # For research use only. Not for use in diagnostic procedures. The DreamPrep NGS method needs to be validated in your lab based on your workflow according to your desired use and laboratory protocols. Tecan makes no claims regarding the performance of the example methods.



Trust DreamPrep NGS with your assays

RELIABLE

FLEXIBLE PROCESSING

FAST

FUNCTIONAL



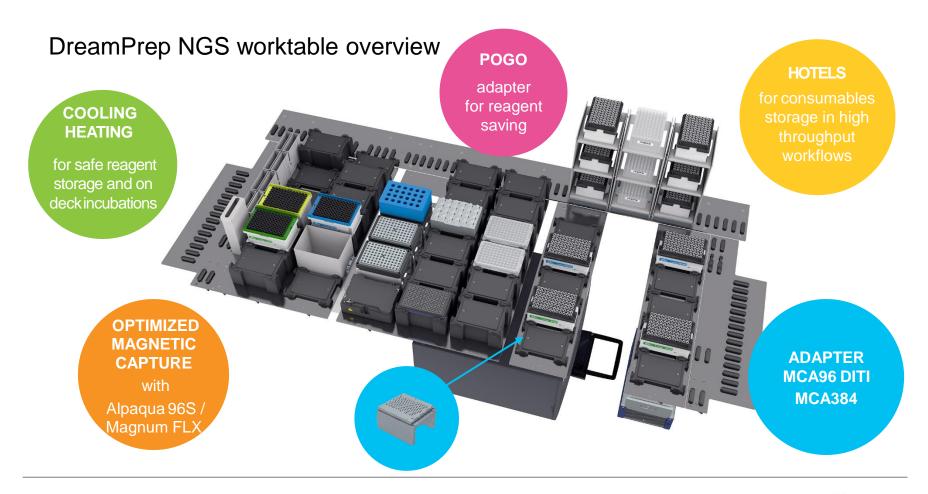
with adaptive signal technology for reagent saving

of up to 2x96 samples per run

with up to 2 normalized libraries in less then 4h

with reader & thermal cycler integrated





DreamPrep NGS – Highlights















Precision Flexibility Speed



Speed Reproducibility





Traceability Monitoring







Fluent Gx Assurance Software (User Mgmt., Method approval, sample tracking, Electronics records, Audit tool)





No errors Protected scripts





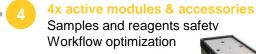


Reader Q&N integrated





Walk-away protocols







Workflow optimization Speed Integrations





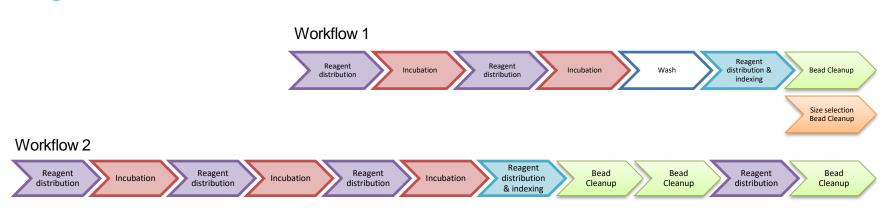
DreamPrep NGS - Modular scripting

NGS modules development

NGS workflows are based on the repetition of similar steps multiple times throughout the same protocol and between protocols

Time saving using the already developed modules

- 1 Quick and easy run optimization
- New workflows development in weeks rather than months





DreamPrep NGS - Software package

Fluent GX Assurance software for regulated environments

Touchscreen-based everyday workflow interactions for fast onboarding of operator. Advanced process security features (user management, sample tracking and more).

Tecan Connect™ app for remote monitoring of instrument status

Introspect™ to receive valuable insights on your instrument usage and availability

- Understand your system utilization
- Increase productivity
- 3 Attain faster production and lower costs
- Understand the cost of consumable usage
- 5 Reap the benefits of automated solutions
- 6 Get notified wherever you are







TECAN FCA – Flexible Channel Arm with 8 independent pipetting channels



Tecan FCA

- Automatic spacing from 9 38mm between labware formats
- Positional definition +/- 0.1mm in all axes for high density plate formats
- Teach-free 384-well access
- Patented* next generation liquid level detection
- Access to 6 plates or tip boxes in depth

Feature	Description		
Tip Ejection System	Designed to keep aerosols away from the deck area		
In-line filter	 Protection against contamination Safety stop in case of liquid infiltration into the channel 		
	Pierce and aspirate		
	Plate seal piercing		
	Low maintenance		
	 Just clean DiTi cones at end of day High chemical compatibility (no sensitive o-ring on liquid path needing to be exchanged) 		
High definition	0.5μl to 1000μl		
pipetting	0.5μl CV<5% at ± 10% accuracy 200μl CV<0.2% at ± 0.5% accuracy 6 x 5μl CV<6% at ± 5% accuracy		

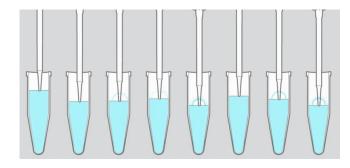


Adaptive Signal Technology

ADVANCED LIQUID LEVEL DETECTION

- Proprietary* safe & fast liquid detection
- Double signal confirms each detection
- Save sample and precious reagent
- Calculation of liquid volume present
- Increased sensitivity
- Low dead volumes
- Aspiration monitoring
- Liquid arrival check



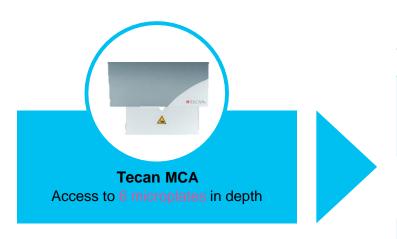


Fluent offers a patented liquid level detection technology, independent for each channel and with increased sensitivity



^{*} Link or refer to patents on www.tecan.com/intellectual_property/ patent_portfolios.

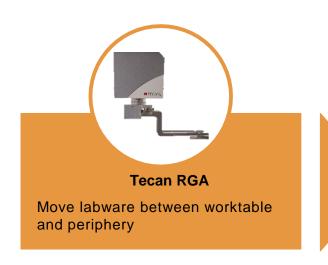
TECAN MCA – Multiple Channel Arm 384/96 for keeping reproducibility between samples



Feature	Description		
Automatic exchange 384 ⇔ 96 tip adapters within seconds	 saves space reduces investment versus complete head exchange 		
96 tip EVA (Extended Volume Adapter)	 Pipette with 96 tips 50, 100, 150, 200, 500 µl disposable tips 		
Row & column functions	• 384, 96, 24, 16,12 & 8 channels		



TECAN RGA – Robotic Gripper Arm for safe resources transfer over the deck and to the lower cabinet



Feature	Description	
Fast, precise & quiet	< 5 second average move360 degree continuous rotation	
Long-Z Arm	 extends vertical reach for accessing devices anywhere below the deck 	
Eccentric gripper fingers	 Extend reach beyond pipetting work area for more device & storage access 	



INHECO CPLC - Keeping reagents and samples always at the right temperature with the cooling / heating modules



INHECO CPLCs

- 1 module for ALPAQUA POGO reagent tubes adapter
- 2 modules for PCR plates



CPLC Model	Parameters
Input voltage / max. current	12Vdc / 4.5 A
Temperature range	+4°C to +70°C [+39.2°F to +158°F]
Temperature range ambient	15°C to +32°C [+59°F to 89.6°F]
Temperature cycling	no
Max reachable temperature difference in the heating mode	up to 80K
Max. reachable temperature difference in the cooling mode	up to 30K
Outer dimensions for Length x width x height in mm	129 x 89 x 80
Weight incl. cord	approx. 1.0 kg



QInstruments BioShake 3000 - Mixing reagents in the most efficient way



QInstruments BioShake 3000
1 unit with the PCR plate adapter



BioShake 3000	Parameters
Outer dimensions for Length x width x height in mm	142 x 99 x 48.2 (5.59 x 3.897 x 1.8976 in)
Shaking Frequency	200 – 3000 RPM
Amplitude (mm)	2
Input	24Vdc
Environmental operating range	+5°C to 45°C
Relative humidity	80% max.



INHECO ODTC - Increasing walk away time with the thermal cycler integration in the lower cabinet



INHECO ODTC

1 unit integrated in the lower cabinet



ODTC 96 Model	Parameters
Temperature range	4°C to 99°C [39°F to 210°F]
Temperature accuracy	±0.3K @ 55°C [131°F]
Temperature uniformity	±0.2K @ 55°C [131°F] ±0.2K @ 72°C [162°F] ±0.2K @ 95°C [203°F]
Adjustable heating rate	from 0.1 to 4.4K/s
Adjustable cooling rate	from 0.1 to 2.2K/s
Heating rate average	max. 4.4K/s
Cooling rate average	max. 2.2K/s
Heated lid temperature	adjustable between 30°C to 115°C



TECAN Infinite 200 PRO Reader – Integrating Norm & Quant steps for fully walk-away solutions



Tecan Infinite 200 PRO Reader

1 unit integrated in the lower cabinet



Infinite 200 PRO F NANO+ Model	Parameters
Input voltage / max. current	12Vdc / 4.5 A
Temperature range	+4°C to +70°C [+39.2°F to +158°F]
Temperature range ambient	15°C to +32°C [+59°F to 89.6°F]
Temperature cycling	no
Max reachable temperature difference in the heating mode	up to 80K
Max. reachable temperature difference in the cooling mode	up to 30K
Outer dimensions for Length x width x height in mm	129 x 89 x 80
Weight incl. cord	approx. 1.0 kg





ALPAQUA Ring Magnet Plates – the right Magnet to each protocol

- One dedicated magnet for each well means fewer edge effects and greater uniformity of results.
- Immobilized beads are spread over a larger area, improving subsequent resuspension and elution.
- 3 Near universal microplate compatibility. Post and bar magnets tend to be customized for specific well geometries.
- Integrated **spring cushion technology** give way when tips come in contact with a well bottom, thus compensating for physical tolerances between labware and pipettors that can compromise precision aspiration:
 - Maximizes sample recovery & reagent usage
 - Improves pipetting consistency







ALPAQUA POGO – to save till the last drop of expensive reagents

- Solid aluminum for efficient cooling
- 24 tube capacity
- 3 Compatible with many screw top vials
- Spring Cushion Technology to maximize usage of precious reagents
- 6 Helps avoid tip crashes and occlusions











TECAN FCA Tips

- 1 Conductive & filtered
- 2 Tecan Pure: lot tested to ensure they are free from human DNA, PCR inhibitors, RNase and DNase
- 3 2304 PCE. SBS
- Does not come with SBS box (Boxes need to be purchased separately)





TECAN FCA Tip Boxes

- 1 Tecan Standard purity level: manufactured in a controlled environment with premium raw material
- 2 10 PCE. SBS
- 3 Empty box





TECAN MCA Tips

- 1 Sterile & filtered
- Tecan Sterile: lot tested to ensure they are free of human DNA, RNase, DNase and endotoxins. Tested and certified to a specified sterility assurance level (SAL).
- 3840 PCE. SBS





Other non-Tecan needed consumables



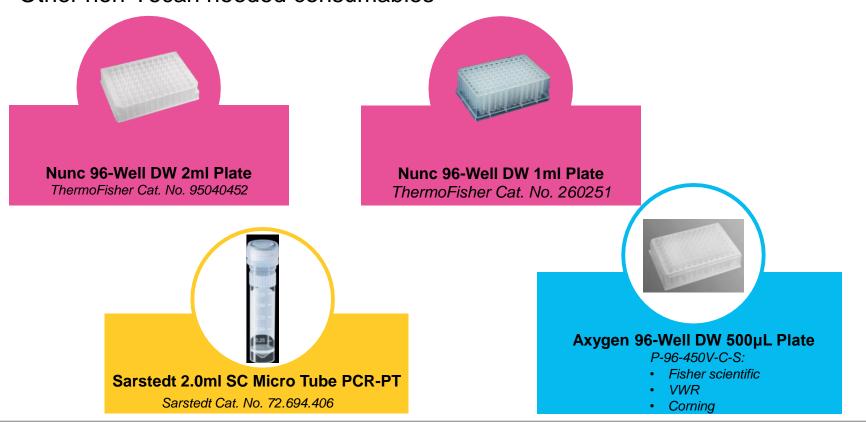


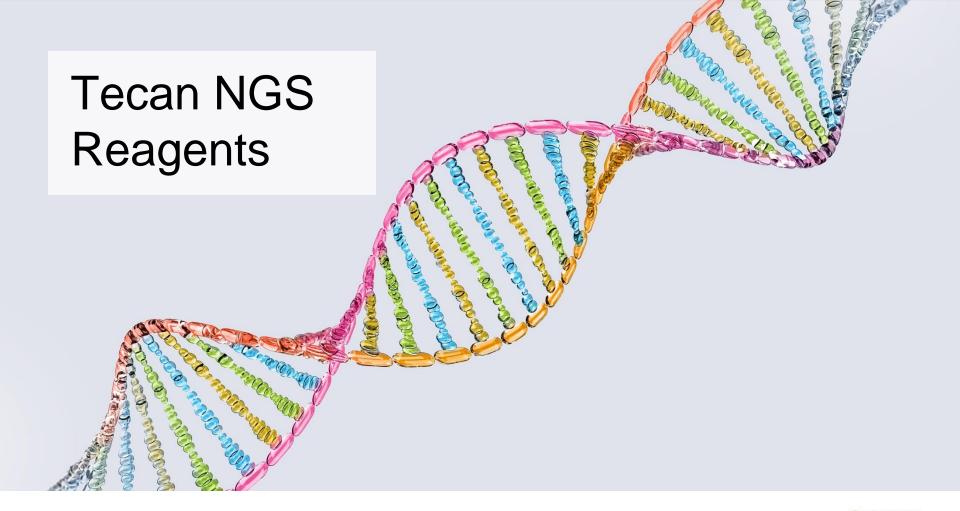
Replaceable by





Other non-Tecan needed consumables



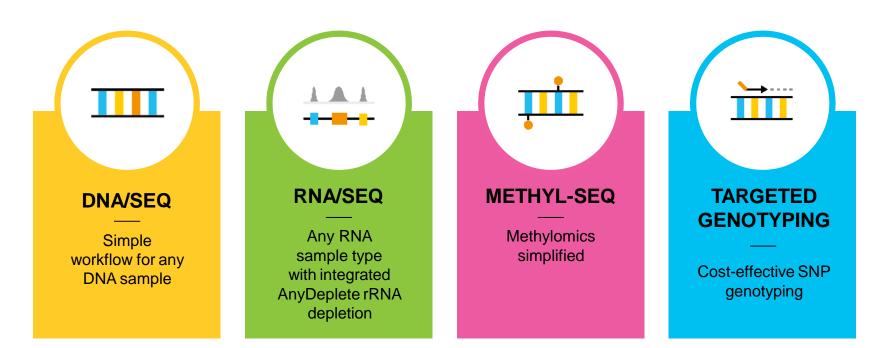


Tecan develops innovative technologies for Next Generation Sequencing (NGS) library preparation kits





Tecan provides library preparation solutions for a broad range of sample types and applications





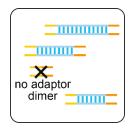
Combining core technologies in innovative products to deliver market leading solutions



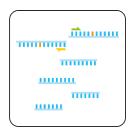
Enzymatic Fragmentation



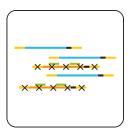
NuQuant®



DimerFree®



SPET: Single Primer Enrichment Technology



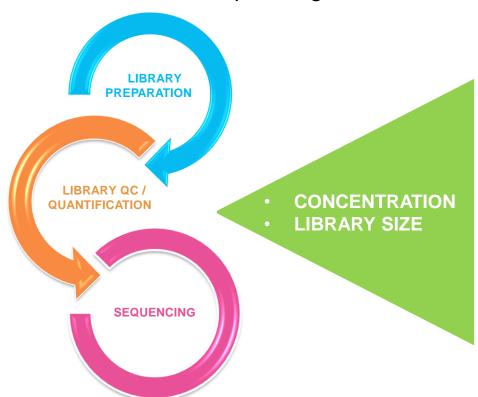
AnyDeplete®



SPIA*: **S**ingle **P**rimer **I**sothermal **A**mplification



NGS workflow for sequencing



QUBIT

- Simple and fast
- Does not differentiate adaptor dimers
- Requires average library size in order to calculate molarity

BIOANALYZER

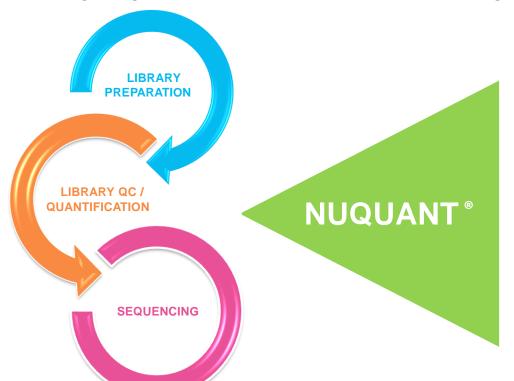
- Gives average size
- Can calculate molarity but can be variable

QPCR

- Calculates mass with intercalating dye
- Error prone with dilution of sample and standards
- Requires average library size to calculate molarity



Re-imagining the NGS workflow for sequencing





- Integrated into the library preparation workflow
- Simple and fast fluorometric assay
- Direct calculation of library molarity
- Accurate multiplexing of libraries for sequencing

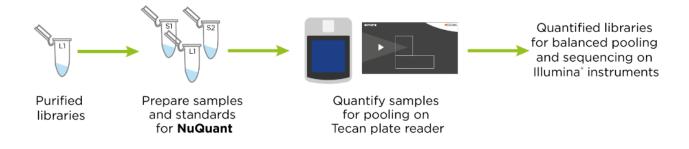


NuQuant – Library QC in under 6 minutes

Measures only sequenceable molecules unlike Qubit or Bioanalyzer

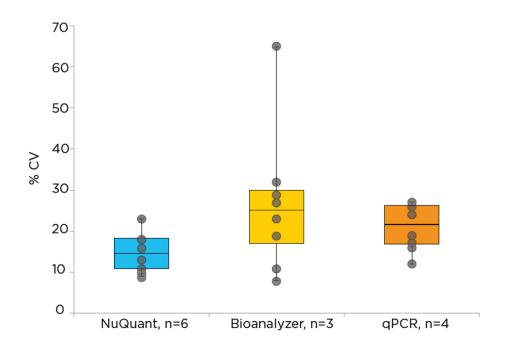
No serial dilution steps like qPCR, no additional reagents Does not interfere with other quantitation methods and does not affect sequence clustering

Compatible with fluorometers like Qubit and standard plate readers





Accuracy of NuQuant library quantification



- Eight libraries quantified at external sites
- Molar concentrations of library compared to qPCR and Bioanalyzer

NuQuant showed the lowest variability and highest consistency between the different quantitation methods.

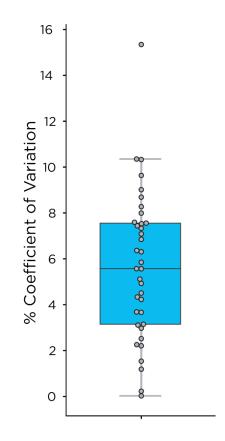


Consistent library quantification using NuQuant

- 147 libraries were generated using Celero DNA-Seq and quantified using NuQuant*
- Quantified libraries were multiplexed into 37 pools and sequenced

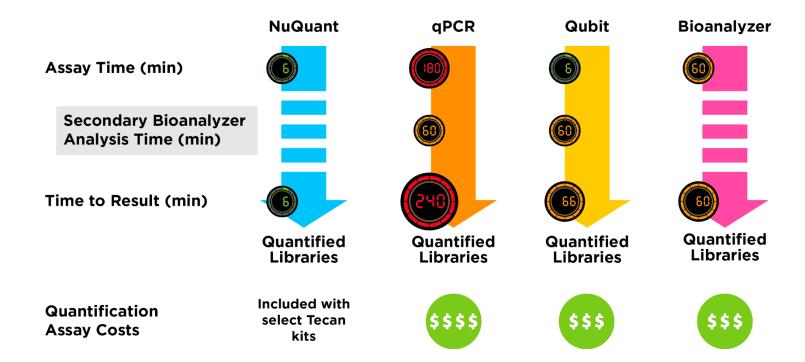
NuQuant showed gives consistent library quantification across multiple samples and library pools.

*Data on file at Tecan.





Reduce the time and cost associated with library quantification

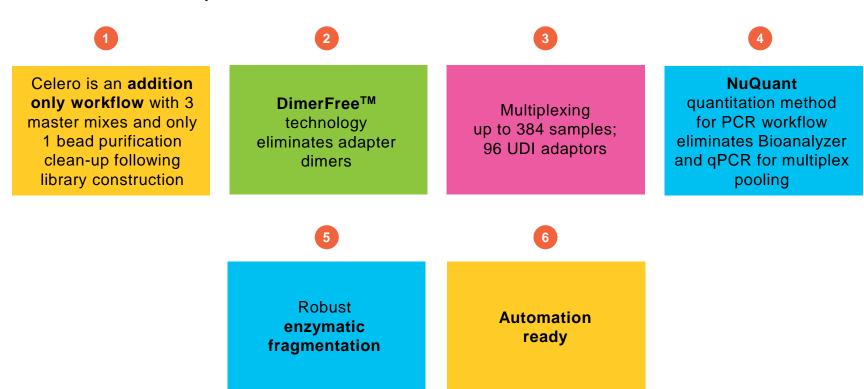








Celero DNA-Seq – Features



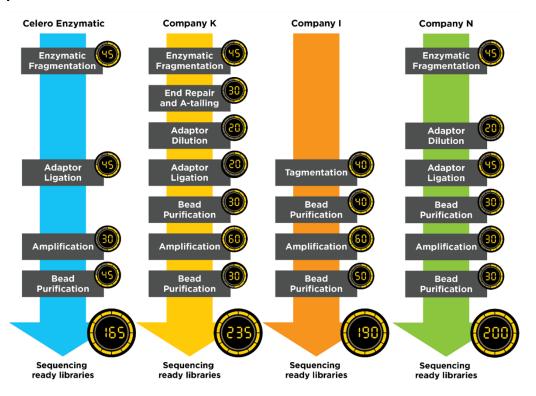


Celero DNA-Seq – Library prep and QC streamlined

Consistent across a broad input range **Enzymatic Fragmentation** Mechanical Fragmentation Finishing/ 1 End Repair Mix 2 Ligation Mix 3 Amplification Ligation Amplification 1 fragmentation 2 Purification & Purification & quantitation quantitation Pooled libraries for sequencing Covaris Genomic DNA fragmented DNA



Celero Enzymatic has a simpler and shorter workflow for quantified libraries





Celero DNA-Seq (Enzymatic) on DreamPrep NGS – Experimental results

STARTING MATERIALS

- 1) 10 or 75 ng of Human genomic DNA NA12878
- 2) 10 ng of a blend of bacterial DNA (3-bacterial DNA blend) at equal mass

KIT

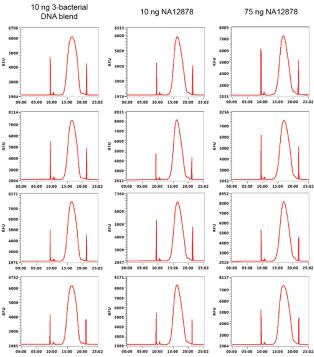
Celero PCR Workflow with Enzymatic Fragmentation (9363A-A01)

INSTRUMENTS

Fluent Liquid Handler with integrated Infinite plate reader and Inheco
On-Deck Thermal Cycler

No library failures for all sample type and input

Library QC with NuQuant resulted in %CV of less than 13%



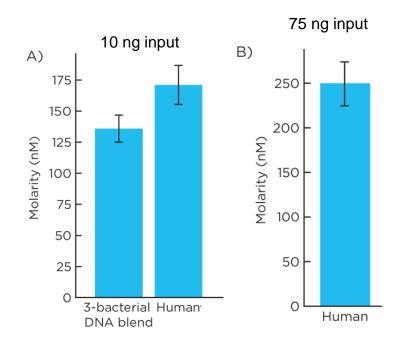
Reference: DreamPrep™ NGS – automated DNA library preparation and quantification on the Fluent® Automation Workstation.



Celero DNA-Seq (enzymatic) DreamPrep NGS Experimental results

DNA LIBRARY YIELD MEASURED BY NUQUANT

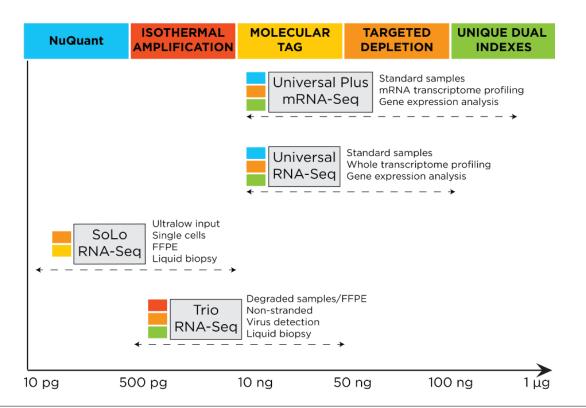
SAMPLE	# OF REPLICATES	AVG INSERT SIZE	AVG% ALIGNED READS
3-bacterial DNA blend	12	294 bp (2.27 % CV)	98.8 (0.09 % CV)
Human Genomic DNA (NA12878)	12	280 bp (1.42 % CV)	96.5 (0.09 % CV)



Reference: Application note "DreamPrep™ NGS – automated DNA library preparation and quantification on the Fluent® Automation Workstation"



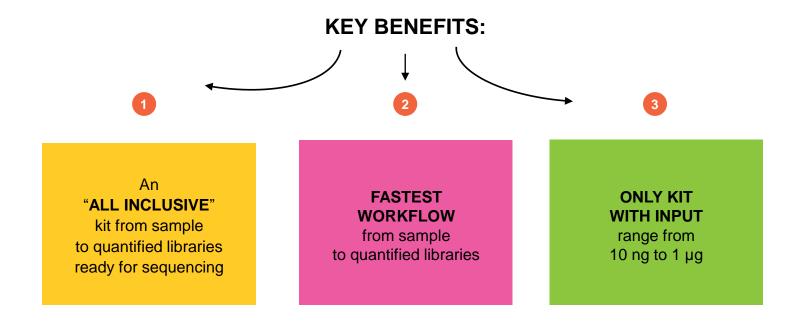
Tecan's RNA-Seq portfolio







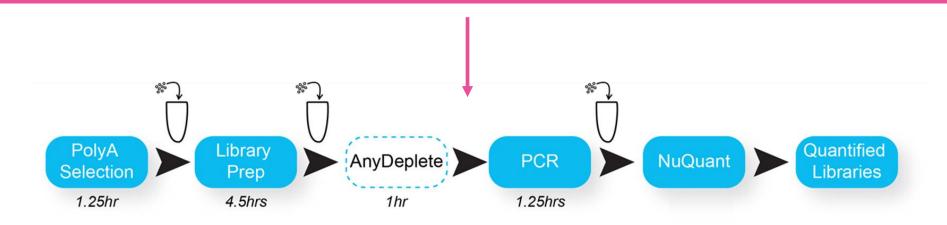
Universal Plus mRNA-Seq with NuQuant





Universal Plus mRNA-Seq with NuQuant helps you to get quantified libraries faster with a short, simplified workflow

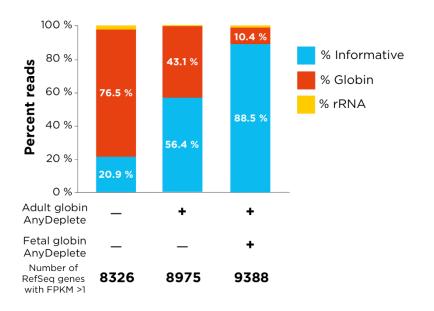
ONLY 7 HRS (8 WITH ANYDEPLETE) TO COMPLETE LIBRARIES!



Customized transcript depletion maximizes sequencing results

STUDY RESULTS:

SAMPLE	NUMBER OF REFSEQ GENES WITH FPKM > 1
Without AnyDeplete	8326
Adult Globin AnyDeplete	8975
Feta + Adult Globin AnyDeplete	9388



Customizable transcript depletion with AnyDeplete[®], increases informative data providing more biological information from each mRNA sequencing experiment.



Universal Plus mRNA-Seq automated on Fluent – Experimental results

STARTING MATERIALS

1) 100 ng Rat Brain RNA or Univeral Human Reference RNA or K562 RNA

KIT

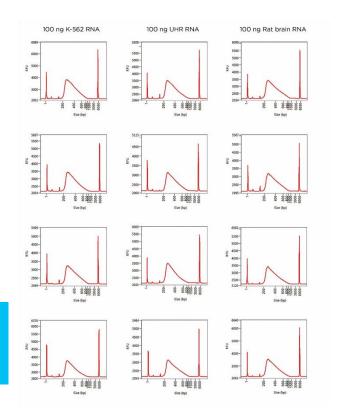
Universal Plus mRNA-Seq with NuQuant (0520-A01)

INSTRUMENTS

Fluent Liquid Handler with integrated Infinite plate reader and Inheco
On-Deck Thermal Cycler

No library failures for all sample type and input

Library QC with NuQuant resulted in %CV of less than 10% Average % alignment of 98%, 92% uniquely aligned



Reference: Application note "NGS DreamPrep- automated mRNA library preparation and quantification on the Fluent Automation workstation"





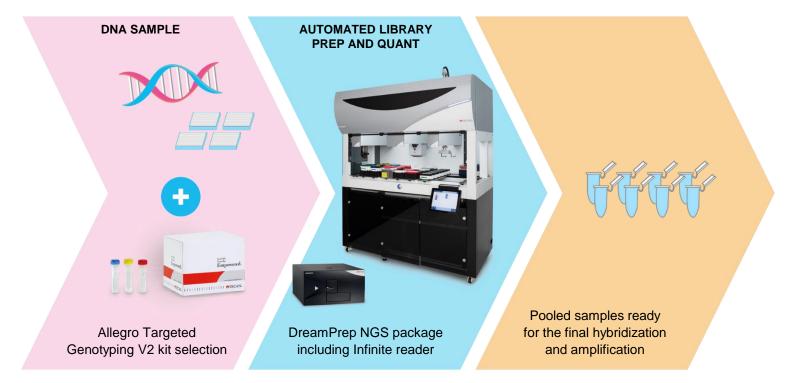
Allegro Targeted Genotyping V2 benefits



 $\textit{Allegro Targeted Genotyping V2 workflow on the DreamPrep$^{\text{\tiny{M}}}$ NGS liquid handling automation platform currently under development.}$



Allegro Genotyping on DreamPrep NGS



Allegro Targeted Genotyping V2 workflow on the DreamPrep™ NGS liquid handling automation platform currently under development.



SNP Genotyping with Maize on DreamPrep NGS

MAIZE GENOTYPING: ALIGNMENT METRICS

	TOTAL READS	PERCENT ALIGNED	PERCENT ON-TARGET	PERCENT ON-TARGET WITH 0X COVERAGE	TOTAL PROBES
Sample Average (n=48)	560,000	90.77	84.40	15.9	50,000

MAIZE MAGIC LINES SEGREGATION ANALYSIS

	Minimum recall 90%	Minimum recall 80%	Minimum recall 50%
Total MAGIC-informative SNPs	37,409	51,651	68,108
W153R SNPs	12,934	18,260	24,857
Mo17 SNPs	15,263	21,728	29,450
HP301 SNPs	16,367	22,976	30,923
H99 SNPs	15,485	21,607	29,305
F7 SNPs	17,344	24,322	32,544

Allegro Targeted Genotyping V2 workflow on the DreamPrep™ NGS liquid handling automation platform currently under development.



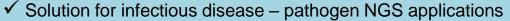


Revelo RNA-Seq for high-sensitivity detection of viral sequences

KEY AREAS OF RESEARCH

- Pathogen detection and characterization
- RNA virus sequencing (e.g. SARS-CoV-2, Flu (H1N1), HIV)
- Whole transcriptome studies for bacterial pathogens
- Impact of infectious disease on human transcript expression
- Meta-transcriptome studies in humans to understand the effects of an infection





- ✓ Human samples
- ✓ Limiting samples such as nasal swabs
- ✓ Single day workflow with integrated library quantification
- ✓ Low-input solution





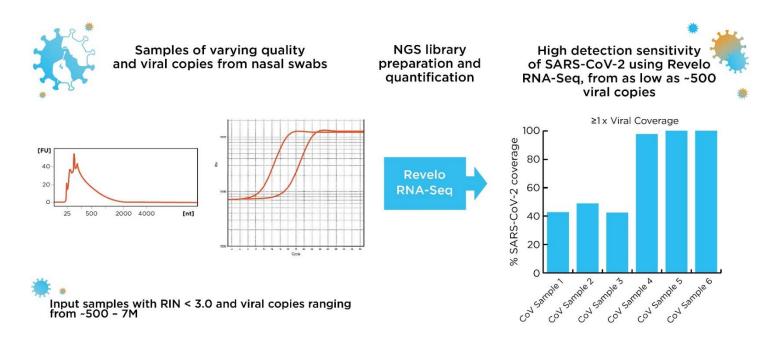
Revelo RNA-Seq resolves challenges in processing infectious disease

sample types Integrated with novel technologies for high-quality NGS library prep Optimized Degraded Low viral samples – degraded inconsisten loads samples Single day t results sample to sequencer workflow High-Revelo Improved sensitivity High human human Low RNA-Seq detection rRNA throughput background depletion Integrated library QC NuQuant 2 day Automation Varying library scripts DreamPrep NGS QC



Real-world sample testing with Revelo RNA-Seq

This kit has been optimized to ensure high-quality libraries from degraded samples



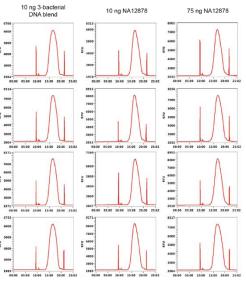


Revelo RNA-Seq – single day sample-to-sequencer fully automated workflow for large scale infectious disease sample testing

Single day, sampleto-sequencer workflow Integrated sample QC with NuQuant

High detection sensitivity

Improved rRNA depletion



No library failures for all sample type and input

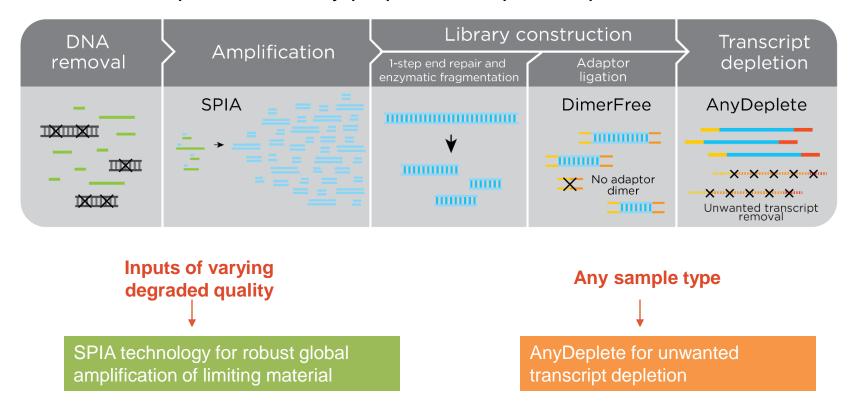
SARS-CoV-2 spike-in samples achieved consistent enrichment

Average ~20 fold viral sequences enrichment





Trio RNA-Seq: Robust library prep for low-input samples



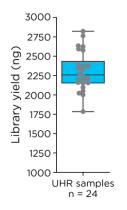
Trio RNA-Seq on DreamPrep NGS – Experimental results

Starting materials: 500 pg UHR total RNA

Kit: Trio RNA-Seq (Part no. 0506)

Instruments: Fluent Liquid Handler integrated with integrated Infinite plate reader and Inheco

On-Deck Thermal Cycler

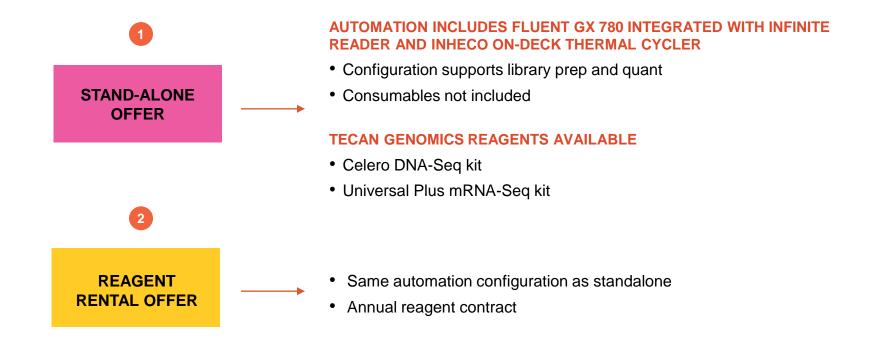


	Average	Average	Average
	percent rRNA	percent aligned	percent exon
	(SD)	(SD)	(SD)
500 pg UHR (n = 8)	6.5 (2.0)	96.5 (0.1)	41.1 (0.8)

- No library failures for all samples
- Consistent library yields across replicates with a 10.9% CV.
- Significant depletion of unwanted human rRNA



DreamPrep NGS available in two options



Summary

- DreamPrep NGS is the only solution that automates library preparation, quantification, normalization and pooling in a single workflow
- Minimal to no manual interaction for library prep and QC
- Library QC done in less than 6 min with no sample loss
- NuQuant quantitation method eliminates Bioanalyzer and qPCR for multiplex pooling
- Robust pooling with NuQuant validated by sequencing results
- Additional NGS library preparation kits will be available on DreamPrep NGS





Disclaimer:

For research only. Not for use in diagnostic procedures. Example methods have not been validated. Please make a copy of this method in order to customize it to accommodate your workflow according to your desired intended use and laboratory protocols.

Tecan makes no claims regarding the performance of example methods.

Tecan - Who we are

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Australia +61 39 647 4100 Austria +43 62 46 89 330 Belgium +32 15 42 13 19 China +86 21 220 63 206 France +33 4 72 76 04 80 Germany +49 79 51 94 170 Italy +39 02 92 44 790 Japan +81 44 556 73 11 Netherlands +31 18 34 48 17 4 Nordic +46 8 750 39 40 Singapore +65 644 41 886 Spain +34 93 595 25 31 Switzerland +41 44 922 89 22 UK +44 118 9300 300 USA +1 919 361 5200 Other countries +41 44 922 81 11

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