

Fluent[®] Mix and Pierce

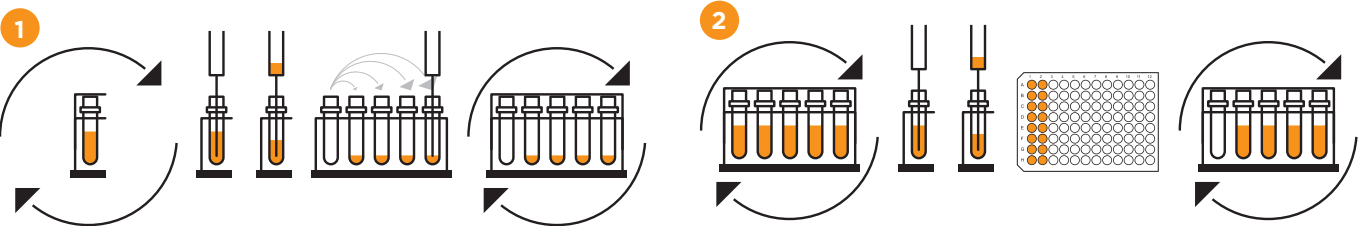
Workstation.

THE FLUENT MIX AND PIERCE WORKSTATION ENABLES PIPETTING FROM VACUUM TUBES WITHOUT MANUAL DECAPPING. THIS, COMBINED WITH 360° TUBE ROTATION AND A BARCODE CROSS-CHECK, DELIVERS CONSISTENT RESULTS AND FULL PROCESS CONTROL, WITH A CAPACITY OF UP TO 480 TUBES PER INSTRUMENT.



CONSISTENT SAMPLE MIXING AND ALIQUOTING WITHOUT DECAPPING

Tecan launched the Fluent Mix and Pierce Workstation to provide automation for sample distribution without the need for tube decapping, eliminating tedious manual work and the risk of technical or human errors. The unique workflow guarantees traceability and consistent sample treatment, leading to standardized results and productivity gains.



Sample distribution from tube-to-tube 1 or tube-to-plate 2

- Barcode verification during loading
- 360° tube rotation or oscillation for standardized mixing
- Aliquot creation through closed tube caps
- Suitable for clinical applications

SIMPLIFYING REGULATORY COMPLIANCE

The Fluent Mix and Pierce workstation is a Fluent Gx configuration. The Fluent Gx is a platform designed specifically to meet the needs of regulated laboratories, with all the advanced process security features required for applications in clinical, GMP and QC facilities. It combines all the liquid handling and workflow benefits already familiar to Fluent users with the Fluent Gx Assurance Software, a suite of software features necessary to comply with stringent regulatory requirements, including FDA 21 CFR Part 11.

Regulation and typical applications	GMP	Clinical
IEC 62304 Medical device software (life cycle processes)		●
ISO 13485 Medical Devices Quality Management System / 21 CFR 820 Quality System (US FDA)	●	●
Enabling 21 CFR Part 11 (Tecan software is developed under ISO 13485, and offers multi-level user management, supporting compliance to 21 CFR electronic records/signatures)	●	●
ISO 14971: Medical devices – application of risk management to medical devices		●
IEC 61010-1 applicable parts: safety requirements for electrical equipment for measurement, control and laboratory use	●	●
IEC 61326-1 applicable parts: EMC requirements	●	●
IEC 62366-1 usability engineering (human factors)		●

Note: This is not a comprehensive list. For more information contact your local service engineer.

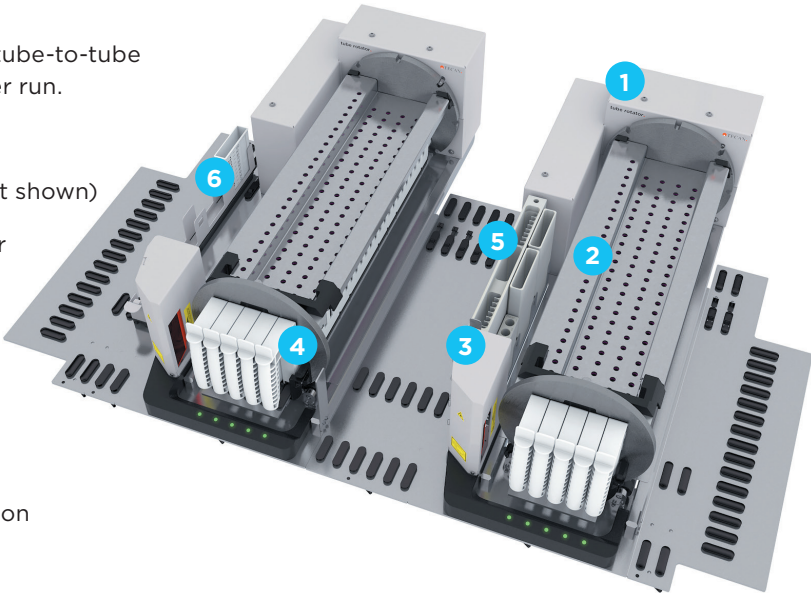
WORKDECK LAYOUT

For tube-to-tube sample distribution

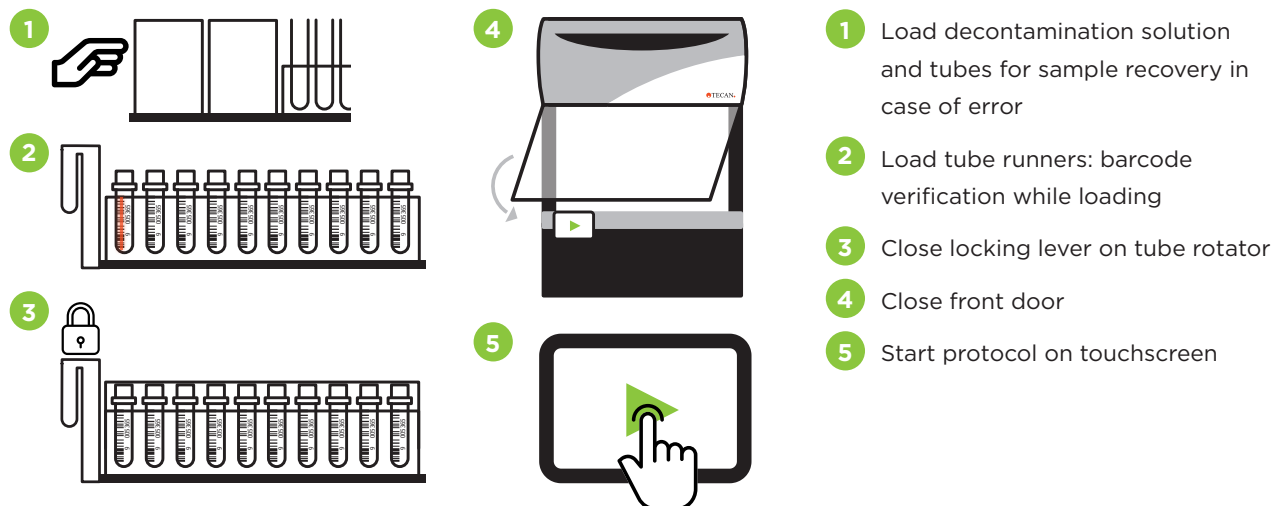
The Fluent Mix and Pierce Workstation shown for tube-to-tube sample distribution has a capacity of 240 tubes per run.

Recommended set-up:

- Fluent 480 with Flexible Channel Arm™ (FCA, not shown)
- 2x Tube Rotator™ 1 with up to 4 different cover configurations 2 for different combinations of tube lengths and a 1D Barcode scanner 3
- 10x tube runners 4 of the required sizes
- Integrated deep wash and decontamination station 5 on one Tube Rotator
- Trough runner 6 acts as the FCA parking position



SIMPLE WALKAWAY USER INTERACTION



HANDS-OFF PROCESSING

Automated pre-analytical liquid handling ensures higher operator safety and reduced hands-on time, enabling laboratories to increase their throughput and supporting them to take on additional testing requests from new and existing customers.

Eliminating manual decapping and recapping also avoids strain on users' hands and arms, as well as contact with potentially infectious sample material.

No. of primary samples	Time (Min.)	Distribution conditions
24	<30	4 ml primary sample distributed into 4 tubes, 1 ml per tube
96	<40	200 µl primary sample distributed into a well of an SBS plate

Processing time is indicative (protocol-dependent).



The Flexible Channel Arm with **liquid displacement technology** offers a choice of washable fixed tips, piercing tips or disposable tips, with a large dynamic range.

Ideal for the preparation and distribution of samples and controls, the **Flexible Channel Arm** features independent pipetting channels that can access any tube or well configuration, with automatic adjustment of tip spacing between different labware formats, providing outstanding speed of liquid transfers.

Tecan's Tube Rotators scan, pierce and mix tubes, offering a unique combination of functions in a space-saving design.

- Full traceability – 1D barcode scanning of tubes during loading
- LEDs indicate barcode scan status
- Capacitive liquid level detection (cLLD) support during piercing and aliquoting
- Rotates tubes 360° at up to 60 rpm or oscillates at different angles and speeds
- Tube loading capacity of 120 tubes per module
- Four different cover configurations for different combinations of tube lengths



DEMAND-DRIVEN CAPACITY INCREASE

A single Tube Rotator module can accommodate 120 tubes. Depending on the size of the Fluent workdeck, up to 4 modules can be run in parallel. This flexible set-up enables a demand-driven increase in the number of tubes handled on a single instrument, in a single run.

The flexible Tube Rotator cover format enables the use of any combination of 75 mm and 100 mm tubes at a time, separated into 5 different runners.

	Fluent 480	Fluent 780	Fluent 1080
Max. no. of Tube Rotator modules	3	4	4
No. of tubes per module	1-120		
Max. no. number of tubes per instrument	360	480	480

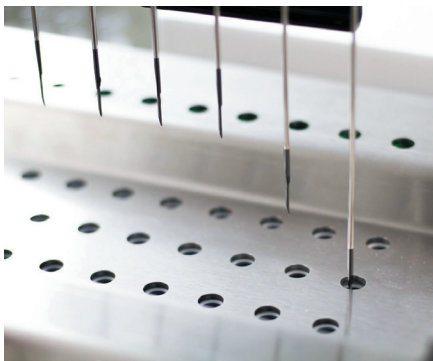
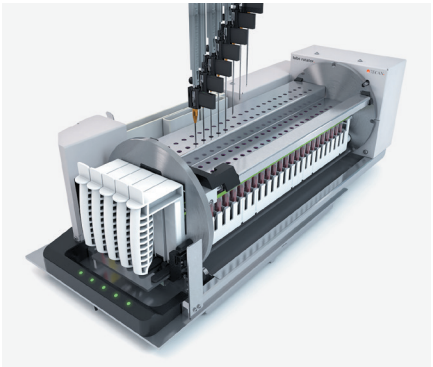
DON'T DECAP - JUST PIERCE

Tecan's Piercing Tips™ have been verified for piercing of BD Vacutainer® and Greiner VACUETTE® tubes.

Each Piercing Tip is long lasting, with 25,000 verified piercings per tip and channel.

Effective decontamination with 1M sodium hydroxide or 2 % bleach, tested in specially designed deep troughs and wash station.

Tube venting technology preserves the sample quality and guarantees excellent pipetting performance.



SUSTAINABLE AND COST-EFFECTIVE SOLUTION

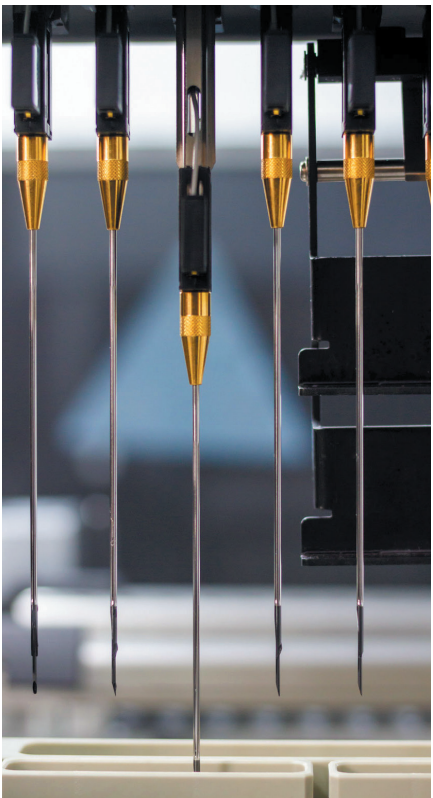
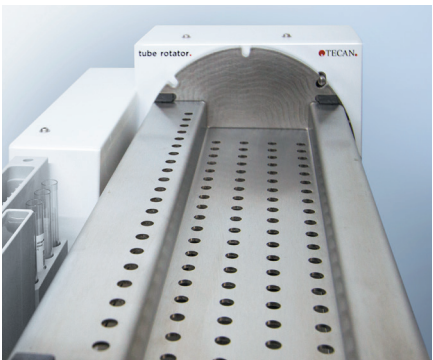
Fixed tips reduce plastic waste and are economic.
Reduced hands-on time frees lab technicians for more valuable tasks.
Specially designed deep wash station and troughs for Piercing Tip cleaning.
Effective washing and decontamination were verified with a human albumin ELISA, using bleach or sodium hydroxide as decontamination liquid.
In >40 % of the samples, no residual human albumin could be detected (LoD <2 ng/ml).*
Overall, in >95 % of the results, less than 50 ng/ml residual human albumin could be determined after decontamination with 1M sodium hydroxide.*

* Indicative values, protocol-dependent

ELIMINATE PIPETTING OF INSUFFICIENT LIQUID

Volume control before and after pipetting

Verify the liquid volume with cLLD **before sample aspiration** to ensure sufficient liquid is present for the process steps that follow.
Set volume tolerances for liquid level detection and enable pipetting based on the permitted deviation/tolerance from the target destination volume.
Get equal distribution of a primary sample over several destination tubes based on liquid level tolerance settings.
Verify pipetting actions **after sample dispense** and use cLLD as a liquid arrival check.
cLLD works through closed tube caps and with open tubes, troughs and SBS plates.





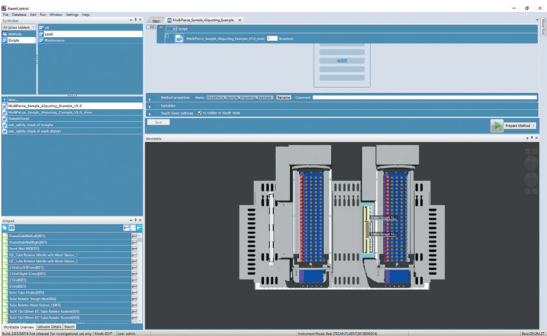
EASY, GUIDED PROCESSES SUPPORT A HIGH WORKLOAD

The unique touchscreen interface simplifies daily activities by guiding users through routine set-up and operation of the system for consistent, reproducible performance.

Automated error handling options and detailed user prompts enable fast learning and help operators to handle critical situations.

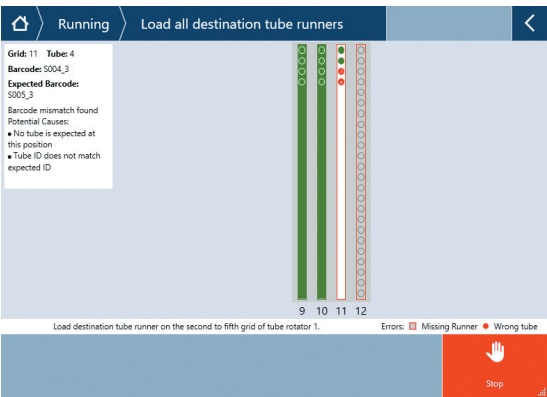
It can provide graphical instructions and prompts for every step of the set-up process.

- Visual guides for loading, unloading and daily maintenance
- Easier compliance with standard operating procedures
- User-specific assay permissions
- Faster start-up for new operators
- Status and run-time progress indicators
- Method Recovery allows a process to be easily recovered



FLUENTCONTROL™, A PERFECT FIT FOR OPERATORS AND PROGRAMMERS

Assay development and configuration is quick and easy using the dedicated programming interface of FluentControl. Users can simply drag and drop commands to create a protocol, using the 3D editor to configure their worktable elements and labware.



SAMPLE CROSS-CHECK

Match primary tube sample IDs with secondary tubes to prevent sample mismatches.

Identify sample duplicates and incorrect sample carrier loading positions on the fly.

Exclude unreadable barcodes.

SAMPLE TRANSFER REPORT

Run overview providing information about sample ID, tube barcodes, detected and transferred volumes and errors to allow individual sample tracking.

Tube rotator	Position	Sample Id	Tube Barcode	Target Volume [ul]	Detected Volume [ul]	Pierce Error	Error List
1	01	S049	S049	6000	6075		ok
1	01	S049	S049_1	1000	1118		11
1	01	S049	S049_2	1000	1029		ok
1	01	S049	S049_3	1000	1075		ok
1	01	S049	S049_4	1000	1050		ok
1	02	S050	S050	6000	5868		ok

LIQUID HANDLING PERFORMANCE

PERFORMANCE PARAMETERS

Coefficient of variation (CV); accuracy (ACC) measured at 20-25 °C/68-77 °F, relative humidity 30-60 % (non-condensing). Altitude ca. 500 m above sea level. Measurements obtained on standard Fluent instruments maintained according to system care instructions. Minimum of 96 measurements. The specified CV and average accuracy are the maximum values obtained overall and per channel.

Pipetting performance with piercing	Liquid	Syringe	Pipetting Criteria	Pipetting Volume	CV	Accuracy
	aqueous solution	1,250	single free disp.	200 µl	≤1.5 %	±3 %
		5,000	single free disp.	200 µl	≤2 %	±3 %
	whole blood	1,250	single free disp.	200 µl	≤2 %	±3 %
		5,000	multi-dis., 4 aliq.	1,000 µl	≤1.5 %	±2 %
Pipetting performance without piercing	aqueous solution	1,250	single free disp.	10 µl	≤5 %	
			single free disp.	100 µl	≤2 %	
			single free disp.	25 µl	≤5 %	
			single free disp.	200 µl	≤2 %	

cLLD limits

- 16 mm diameter tubes: 300 µl
- 13 mm diameter tubes: 200 µl
- SLAS 96-well plates: 40 µl

Determined with whole blood, with and without piercing for BD Vacutainer® and Greiner VACUETTE® tubes; no SBS plate cover (no piercing)

Dead Volume

- 16 mm diameter tubes: ≤800 µl
- 13 mm diameter tubes: ≤500 µl
- SLAS 96-well plates: Not determined

Determined with and without piercing for BD Vacutainer® and Greiner VACUETTE® tubes

Carry over

Determined using human albumin ELISA as residual hAlb after tip washing and decontamination

- In >91 % of samples, <50 ng/ml residual hAlb was detected with 2 % bleach as decontaminant.
- In 45 % of all samples, the hAlb conc. was <LoD (2 ng/ml).
- In 95 % of samples <50 ng/ml residual hAlb was detected with 1M NaOH as decontaminant.
- In >41 % of samples, the hAlb conc. was <LoD (2 ng/ml).

Determined with human albumin ELISA (LoD of <2 ng/ml)

PROCESS CONTROL FEATURES

Positive identification barcode scanning for plates (optional) and tubes (included in Tube Rotator).
Active Stop and Resume: user activated stop via door sensors on safety screen – resume on request.
Door locks to protect process from free access.
Capacitive liquid level detection before and after pipetting, incl. piercing.

SYSTEM CONFIGURATION AND DIMENSIONS

Footprint	Fluent 480	Fluent 780	Fluent 1080
Height (standard Z)	1,236 mm/48.6"	1,236 mm/48.6"	1,236 mm/48.6"
Height (long Z)	2,301 mm/90.6"	2,301 mm/90.6"	2,301 mm/90.6"
Width	1,150 mm/45.28"	1,650 mm/64.96"	2,150 mm/84.65"
Depth	785 mm/30.9"	785 mm/30.9"	785 mm/30.9"

Supported barcodes types: Code 128 (recommended), Code 39 standard, Codabar, Interleaved 2 of 5

	Tube Barcodes	Plate Barcodes
Density	≥6.6 mil	≥3 mil
Height	≥8 mm	≥5 mm
Length (incl. QZ)	≤80 mm	≤80 mm
Number of digits	≤64	≤74
Quiet zone (QZ)	≥10x narrow bar width or 2.5 mm, whichever is greater	

Power requirements Voltage: 100-240 V AC, frequency: 50/60 Hz

Operating conditions Temp. 15-32 °C/59-90 °F, relative humidity 30-80 % (non-condensing)

For more information, visit: www.tecan.com/fluent-mix-and-pierce-workstation.com

The Fluent Mix & Pierce Workstation is a product configuration for sample distribution based on the Fluent Automation Workstation, a fully automated laboratory liquid handling platform for general purpose use. It is not linked to a particular assay, and Tecan is not responsible for any assay claims.

Australia +61 3 9647 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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