Regulations and Procedures for the Use of Equipment TWIN HELIX SRL MILLIFLUIDIC PLATFORM (IV Tech model), acquired under the MUR 2023–2027 Department of Excellence Project

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Approved by the Council of the Department of Food and Drug Sciences on 09/09/2026

Equipment description

The IV Tech system is a fluidic platform for dynamic in vitro models, i.e. systems designed to reproduce more realistic biological conditions than conventional static models. A multi-organ approach can be developed, and environmental conditions (e.g. ambient pressure) can be controlled.

Main technical features:

- Programmable peristaltic pump.
- Compact pressure modulator.
- Dual-flow configuration.
- Sterilizable and reusable chambers for cell growth and tissue perfusion.

Main applications:

- Study of drug permeation and accumulation in in vitro and ex vivo models under biorelevant static and dynamic conditions (perfusion of the donor chamber).
- Real-time visualization of cells and tissues.

Equipment modules:

1. **Bioreactors (dynamic culture chambers)**

These are chambers or modules in which cells or tissues are cultured under controlled conditions, with a dynamic flow of culture medium or fluid to simulate the physiological environment.

IVTech offers several models, including LiveBox1 (LB1), LiveBox2 (LB2), and MultiDyn (MD).

- **LiveBox1 (LB1): transparent chamber for adherent cell cultures; creates a dynamic environment with an inlet and outlet for culture-medium flow; compatible with cell-culture protocols and standard equipment such as microscopes and plate readers; biological material can be easily recovered; autoclavable and reusable.**
  Available versions with an area of …. cm².
- **LiveBox2 (LB2): designed for dynamic physiological barrier models (e.g. air–liquid interface, ALI, and liquid–liquid interface, LLI). Similar to a Transwell system, with a removable porous membrane separating apical and basal compartments. It has two inlets and two outlets for two independent flows or a sigmoidal flow; compatible with standard imaging platforms; biological material can be recovered; autoclavable and reusable.**
  Available versions with an area of …. cm².
- **MultiDyn (MD): compact multi-chamber rack based on the dimensions of a 24-well plate. Each transparent rack contains four independently perfused chambers (2.5 mL each). Reusable up to three times (70% EtOH + UV). Compatible with standard culture and monitoring protocols and LiveBox1 protocols. Enables real-time monitoring with an inverted microscope and a modular multi-organ approach for customized fluidic platforms.**
  Rack dimensions: 8.5 × 2.8 × 1.9 cm – Growth area: 1.8 cm² – Independent replicates: 4.

2. **Peristaltic pump – LiveFlow**

- A compact, lightweight, incubator-compatible peristaltic pump that simulates interstitial flow in real tissue. Designed for placement inside an incubator. It has two independent motors that can operate at the same or different flow rates (up to four independent circuits), in constant or programmable mode. Removable, sterilizable and reusable pump heads.

Available versions:

- **LiveFlow: constant flow rate and direction**
- **LiveFlow PRO: three programmable sub-periods with different flow conditions**
- **LiveFlow PLUS: more powerful motor for high back-pressure applications**

Dimensions: 21.5 × 16 × 14.5 cm – Weight: 1.5 kg – Circuits: 4

In practice, LiveFlow is the heart of the dynamic system: without controlled flow, the desired dynamic conditions cannot be achieved.

3. **Environmental control unit – LivePa**

Module for increasing hydrodynamic pressure in dynamic in vitro models. It simulates phenomena such as hypertension or glaucoma: a motorized piston narrows the outlet tubing lumen to increase pressure. Compatible with LiveBox chambers (LB1, LB2) and can be placed in the LiveFlow drawer.

Dimensions: 8.5 × 2.8 × 1.9 cm

In summary:

The overall concept is to build an integrated, modular system in which:

1. The chambers (bioreactors) house cells or tissues under dynamic conditions (flow and exchange).
2. The LiveFlow pump generates controlled culture-medium flow through the chambers.
3. The LivePa unit modulates hydrodynamic pressure, allowing variable pressure conditions to be simulated (as may occur in vivo under physiological or pathological conditions).

The aim is thus to create more realistic in vitro models than static cultures, incorporating dynamic, mechanical and environmental stimuli to approximate the actual behavior of human tissues.

Authorized staff and trainers

Surname	First name	Department/Centre	Contact
Nicoli	Sara	Food and Drug Sciences	sara.nicoli@unipr.it
Demurtas	Anna	Food and Drug Sciences	anna.demurtas@unipr.it
Pescina	Silvia	Food and Drug Sciences	silvia.pescina@unipr.it

*Staff who have completed technical training and are authorized to perform maintenance, calibration and component replacement on the equipment.

The list of authorized personnel is kept continuously updated and is provided in Annex 2 to these Regulations.

Equipment access and use

1) 1) ALIFAR Department research groups with authorized users may access the equipment through their own staff, subject to booking on the dedicated Teams platform managed by the Technical Contact. Those without an internal contact may contact the designated staff. Access remains subject to booking through Teams. Use without a reservation results in a charge for a full working day (eight hours). Only personnel who have completed initial training (authorized personnel and trainers), or have subsequently been trained by authorized trainers, may use the equipment.
2) 2) Users from other University departments and external users may contact the Scientific Coordinator by completing the analysis request form (Annex 1).

Fees

Three user categories apply to equipment-use charges:

1) 1) ALIFAR users: University of Parma academic staff and researchers affiliated with the ALIFAR Department;
2) 2) Internal users: University of Parma academic staff and researchers;
3) 3) External users: researchers and staff of universities, research institutions, and public or private organizations.

Type of analysis	ALIFAR USERS (EUR/hour)	NON-ALIFAR INTERNAL USERS (EUR/hour)	EXTERNAL USERS
Assessment of active ingredient permeation across a membrane: one test	**1**	**8**	**250**
Assessment of active ingredient permeation across a membrane: 2–5 tests	**1**	**8**	**500**
Assessment of active ingredient permeation across a membrane: more than 5 tests	**1**	**8**	**750**
Assessment of active ingredient accumulation in biological tissue from topical formulations	**1**	**8**	**300**

Note: one test corresponds to one measurement

ALIFAR users who contribute their own research funds to preventive maintenance and/or annual full-risk insurance contracts, or to repair costs, will not be charged until their contribution has been fully offset.

Annex 1. TWIN HELIX SRL MILLIFLUIDIC PLATFORM (IV Tech model)

to be emailed to authorized personnel

Applicant details

INTERNAL USER – UNIVERSITY OF PARMA
Department/Centre:
Applicant:
User:
E-mail:
Telephone:

EXTERNAL USER
Company/organization name:
VAT number/tax ID:
Address:
Applicant:
User:
E-mail:
Telephone:

Information on samples and type of analysis

Type of analysis	
Sample type (briefly describe, specifying the matrix)	
Solvent or solvent mixture in the sample	
Hazard factors	**flammable irritant acute toxicity harmful corrosive oxidizing carcinogenic/mutagenic hazardous to the environment**
Analytes of interest (names/class)	
Modules to be used (in addition to LivePro)	☐ LiveBox1 ☐ LiveBox2 ☐ MultiDyn ☐ LivePa

A booking may be cancelled up to the third working day before the requested date.

If the booking is not cancelled within this deadline, the service will be charged even if not used.

Date …….

Applicant's signature (holder of the funds)

……

Annex 2. List of personnel authorized to use the equipment

Authorized personnel and trainers*			
Surname	**First name**	**Department/Centre**	**Contact**
Nicoli	Sara	Food and Drug Sciences	sara.nicoli@unipr.it
Demurtas	Anna	Food and Drug Sciences	anna.demurtas@unipr.it
Pescina	Silvia	Food and Drug Sciences	silvia.pescina@unipr.it
Authorized permanent staff			
Surname	**First name**	**Department/Centre**	**Contact**
Bianchera	Annalisa	Food and Drug Sciences	annalisa.bianchera@unipr.it

*Staff who have completed technical training and are authorized to perform maintenance, calibration and component replacement on the equipment.