REGEMAT 3D

Reg4Life

Personalized systems for
your research.

What would you like to create?

Contents

Modular and Customizable System

Each particular investigation is unique and requires a specific configuration, there is no bioprinting system adapted to all research applications, therefore at Regemat 3D we develop your Reg4Life version for your particular group and research project.

The Reg4Life equipment is also a completely modular system that allows you to readapt it for future research as many times as you wish without having to purchase a new equipment. Additionally, its Plug & Play print head exchange system will allow you an easy, fast and simple way to exchange the heads for each printing process.

Equipment Design

The Reg4Life is designed entirely in PVC, which permits a substantial weight reduction in the equipment with less than 30 kg, which together with the grip handle systems, facilitates its transport, handling and introduction into a laminar flow cabin. In this way, investigation in total aseptic conditions is guaranteed to much more extent than with HEPA filters.

At the engineering level the new design of the bioprinter has been developed to promote laminar flow from the base to the top of the equipment. For the same purpose, a closed side compartment is provided where the filament rolls are placed so they do not affect laminar flow in any way.
It has been designed with rounded shapes avoiding corners where dirt or bacteria can accumulate, making cleaning and disinfection of the equipment easier and faster.

Additionally, the PVC covers allow chemical disinfection with alcohol 70% or formalin, by thermal shock, and by UV or gamma radiation.

In Regemat 3D we have a clear objective, **to be able to translate our technology, our equipment of reduced measures to the clinic together with our collaborators, we check even the smallest details to be able to work in aseptic conditions and in compliance with GMP regulations.**

Print head

The new head developed for the Reg4Life allows precise and efficient control of the adjustment movements in the X, Y, Z axes of each of the tools independently.

It is configured with three Plug & Play print heads that in a simple way facilitates the exchange of the different syringes and printing tools. The system includes as standard a double thermoplastic extruder that enables it to print two different filaments during the same printing process.

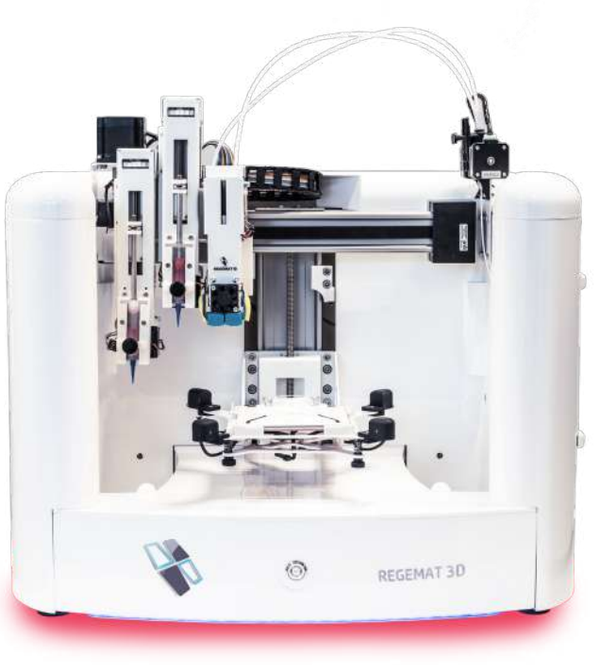
Led-light system

The equipment integrates a led-light system to guide you during the whole experimental process, indicating the stage of your bioprinting procedure through a 3-color code.

Blue Ocean: Ready to bioprint.

Lime Green: Bioprinting in process.

Intense Red: Paused process.



Automatic Calibration System.

The laser sensor system included in the Reg4Life 3D bioprinter as standard performs **a precise and automatic calibration of all the tools without the need for the user to intervene in the process.**

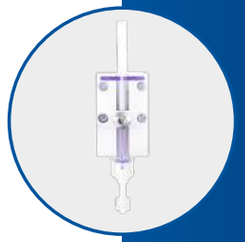
Being accuracy and resolution the main premises of this equipment, an even more precise adjustment can be made through the software, thus achieving total precision with the different types and diameters of syringes and nozzles.

Syringes | Tools

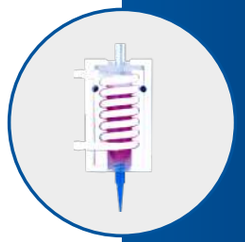
Reg4Life print head configuration with the different types of syringes is the result of our more than 5 years of collaborations with research groups around the world.

This experience guarantees our equipment can be adapted to the nature of the different materials and bioinks on the market.

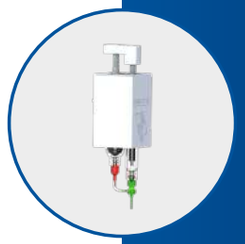
The Reg4Life is the only equipment, which refrigeration system allows controlling temperatures from -20 to 100°C.



Two-component syringe

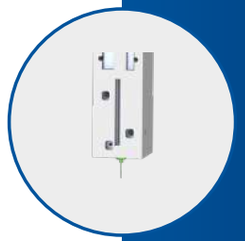


Refrigerated syringe

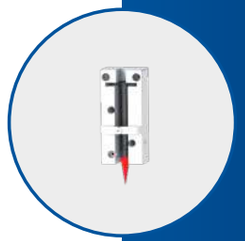


Coaxial Syringe

Metallic syringe (up to 250°)



High temperature heated metal syringe



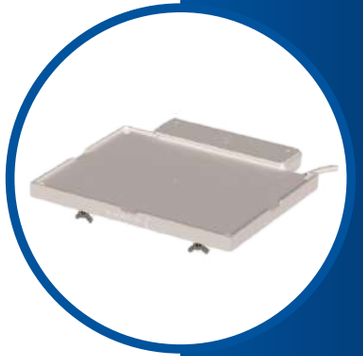
Heated syringe (up to 50°C)

Print bead and bioprinting surfaces

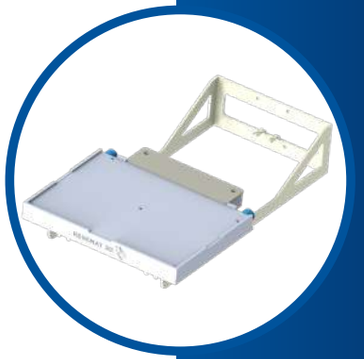
The automatic calibration technology in the X, Y and Z axes together with the independent movement system in the Z axis of the heads allows a precise adjustment of the printing height of the material that allows the system to print on different surfaces.

As standard, the Reg4Life system has a glass bed with an extended 220mm x 160mm x 110mm working area that allows to create 150mm x 160mm x 110mm constructs. Petri dishes and 6-12-24-96-128 well plates adapters are included. The heating bed, which comes as standard permits temperature control from room temperature to 120°C.

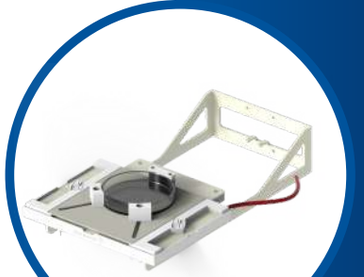
Optionally, the bed cooling system can be included to work with temperature ranges from -20 to 120°C.



Heated Bed



Cooled Bed



Petri dish Adapter

Multiwell Plate Adapter

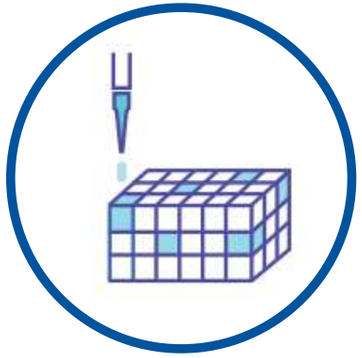
Technology

Reg4Life system has been implemented and adapted with the aim of optimizing the bioprinting process. The software and hardware are configured for the use and precise control of standardized FDM and IPF technologies. **Our equipment is the only one on the market validated for the use of IVF technology developed entirely by Regemat 3D**

FDM

Fused Deposition Modeling. This technology **enables the modeling of the scaffold with the purpose of creating complex external structures** and a meshed internal structure.

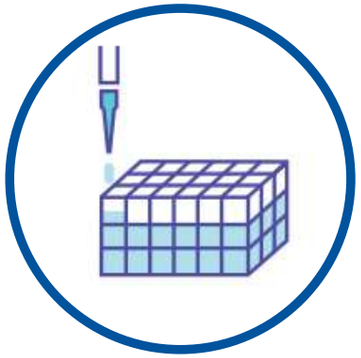
In this process of additive manufacturing, a thermoplastic material comes into contact with the hot surface of an extruder, which gradually deposits the material layer by layer.



IPF

The Injection Pore Filling technology enables to select specific layers on which to inject cells into the selected pores. This also permits the injection of controlled amounts that can be even different in each layer.

This technology enhances and guarantees cellular viability and survival in extreme conditions, as occurs working with thermoplastics at high temperatures.



IVF

The Injection Volume Filling technology developed exclusively by Regemat 3D, and therefore being the only system on the market adapted to this technology.

The IVF technology permits a complete injection of the bioink ensuring the filling of all the scaffold layers after printing. This technology facilitates the filling of volumes when working with small areas as in case of osteochondral injuries.

Software

Reg4Life software has been entirely developed by Regemat 3D. It allows the precise control of all the parameters of the bioprinting processes, **even customizing and adapting it to the specific needs of each research team and specific bioprinting processes.**

REGEMAT 3D Designer allows you to print different 3D objects simultaneously in a single process, each one configured in independent manner.

Object Pre-Visualization

Our software is totally intuitive and **allows both the design of your own structures and the import of geometries from .stl files.**

Once the structure has been designed or imported by means of a preview of the piece, we can configure the internal mesh and a wide range of printing parameters.

Features

1. Loading and interactive display of models in .STL format.

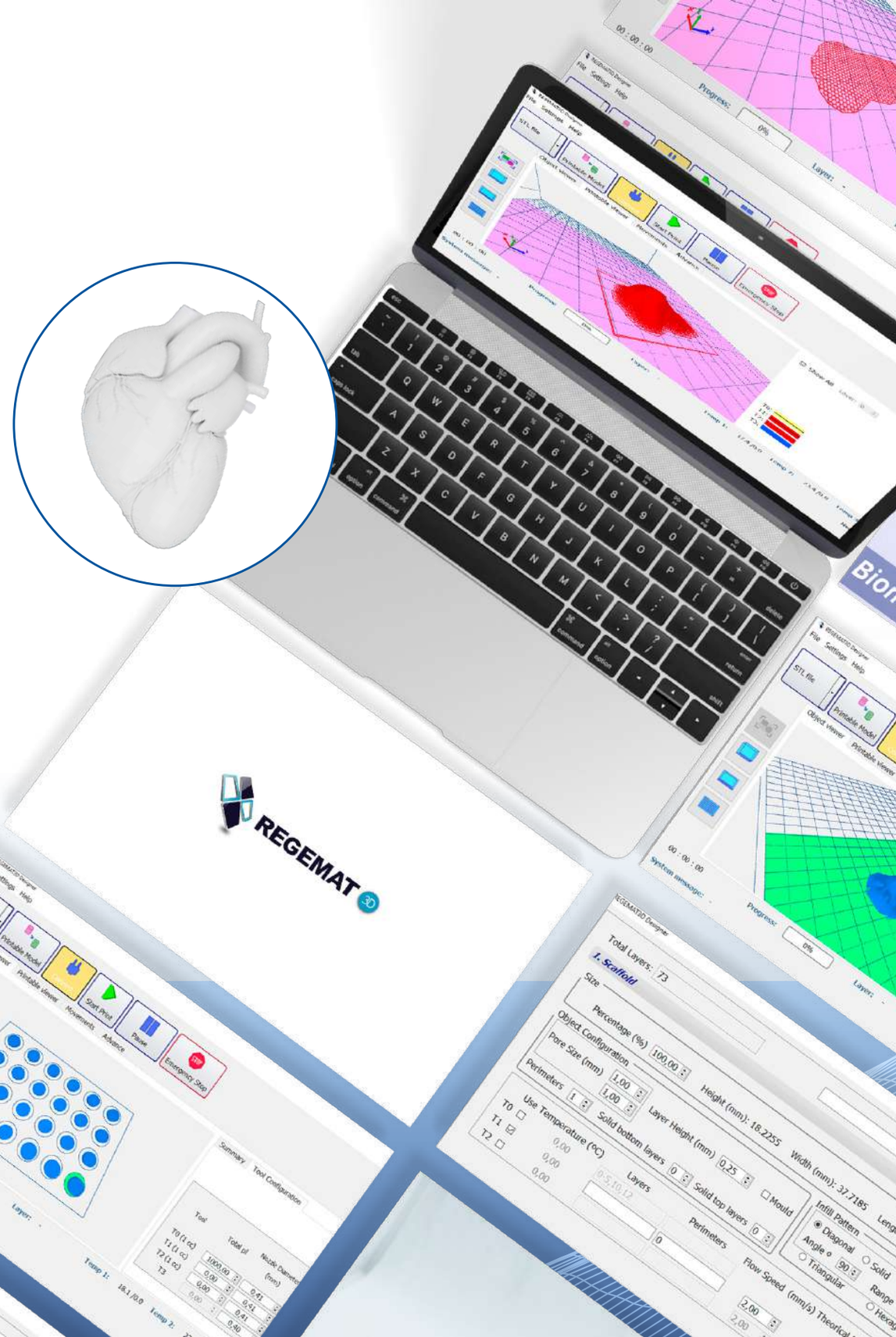
2. Possibility of configuring each of the printing phases and parameters by loading G-codes.

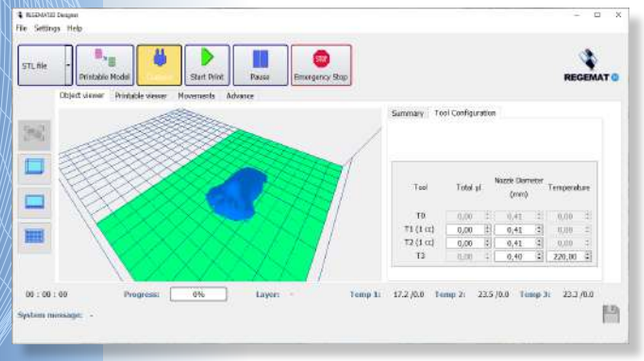
3. Configuration of a multitude of scaffold parameters.

4. Generation and interactive display of layered print paths.

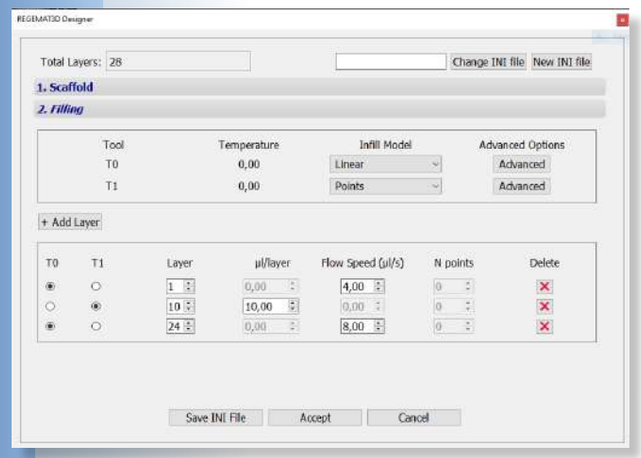
5. Injection configuration (injection point, injection layer, quantity to be injected)

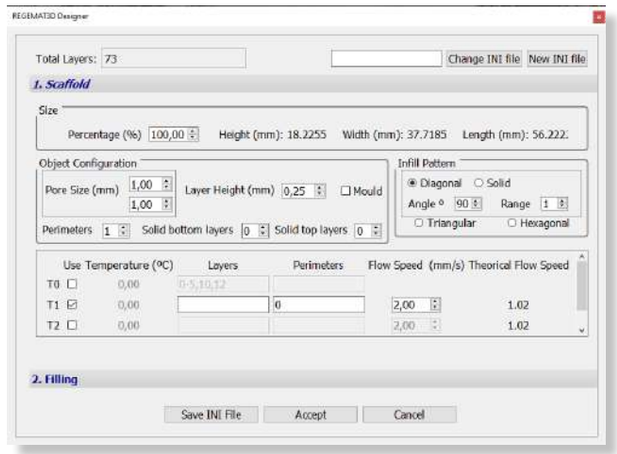
6. Printing on different platforms.



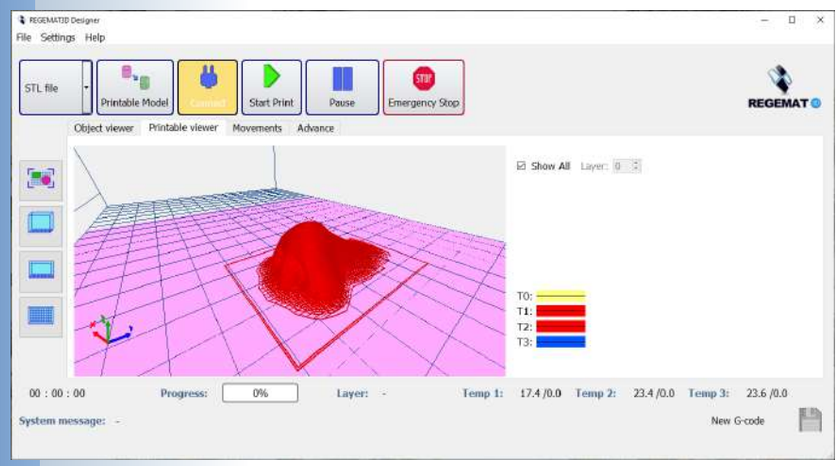


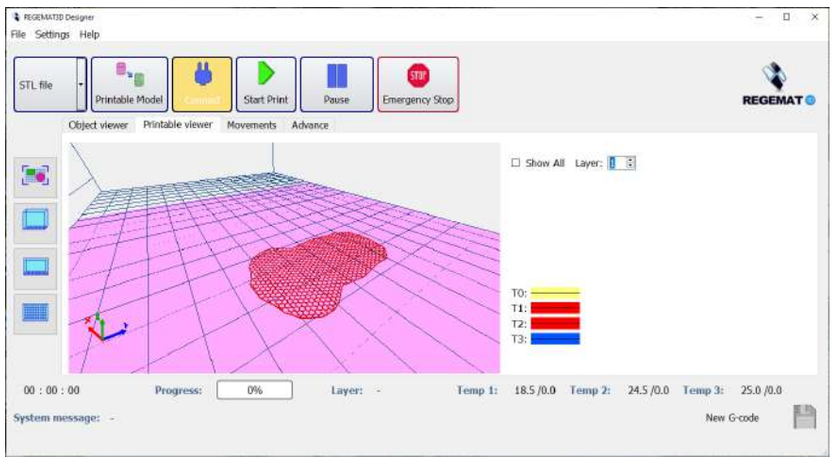
1. Allows you to import designs previously created in CAD software



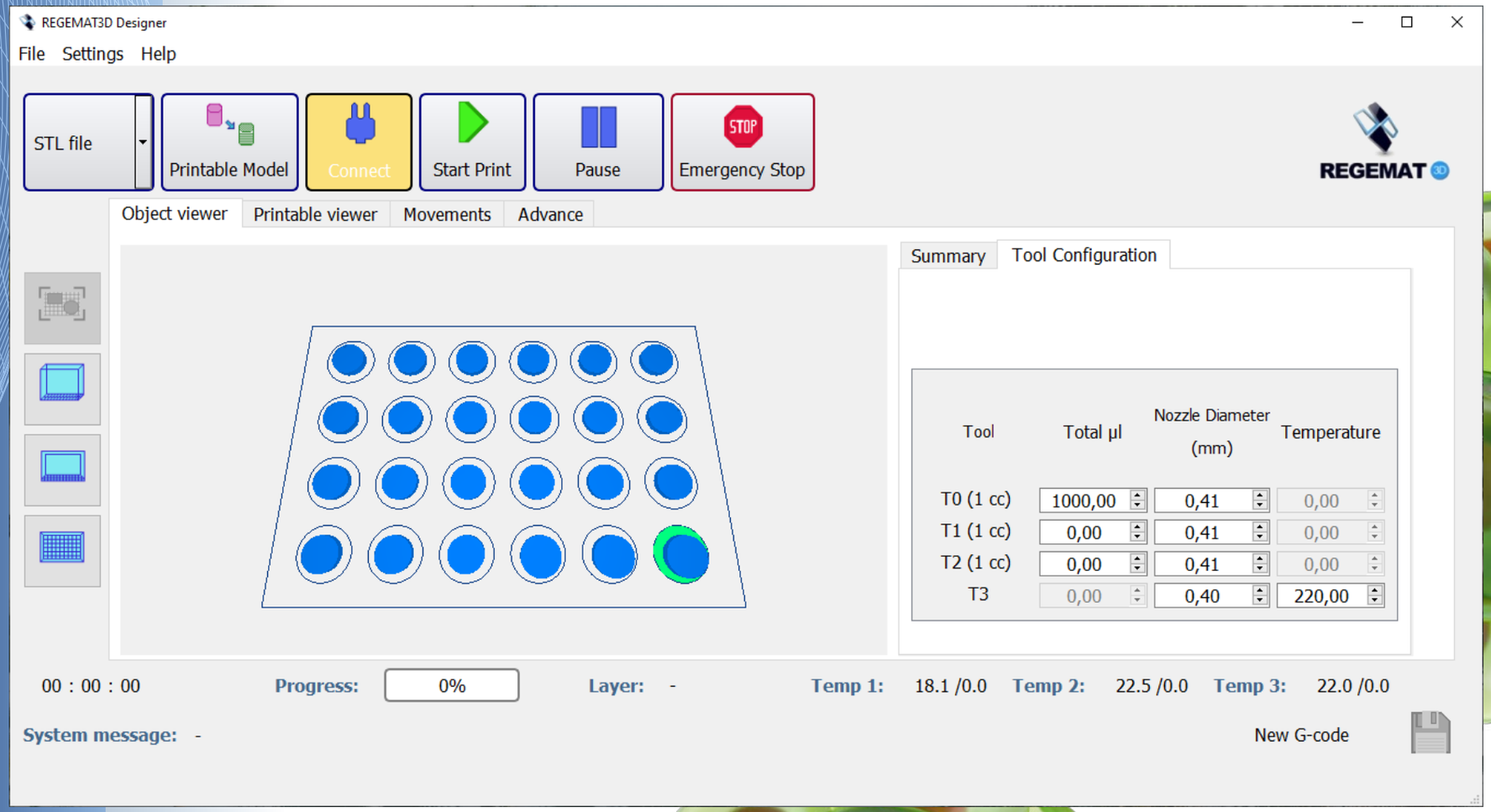


2. Facilitates the configuration of different parameters: layer height, pore size, perimeters, type of infill, etc.





3. It is possible to see the progress of the model that is being printed, layer-by-layer.



4. Allows you to choose between different injection options: By points, linear, etc.

Reg4Life components

The Reg4Life printer is equipped as standard with the latest technologies, such as the automatic calibration system using laser sensors, heated syringe (0-50°C), heated bed (0-120°C), and double thermoplastic extruder. We allow additional configurations as in Regemat 3D we adapt the bioprinters not only to the needs of each research group but also to each investigation in particular. We can even design and develop Ad-hoc tools or specific configurations and developments at the software level.

As researchers, we have developed the Reg4Life software and hardware for researcher teams, which allow us to be the only company worldwide that can customize bioprinting systems and adapt it to the real needs of each of our collaborators.

Bi-component Syringe

Simultaneous extrusion of two mixed materials to produce a homogeneous composite.

Metallic syringe

It has electrically controlled heating system to distribute heat evenly up to 250°C. It has an electronic control system of the filament created.

Refrigerated Syringe

Uniform heating and / or cooling system throughout the entire surface to keep the temperature stable. Temperature of the material decreases through a heat exchanger -20 to 100 °C.

High temperature extrusion system

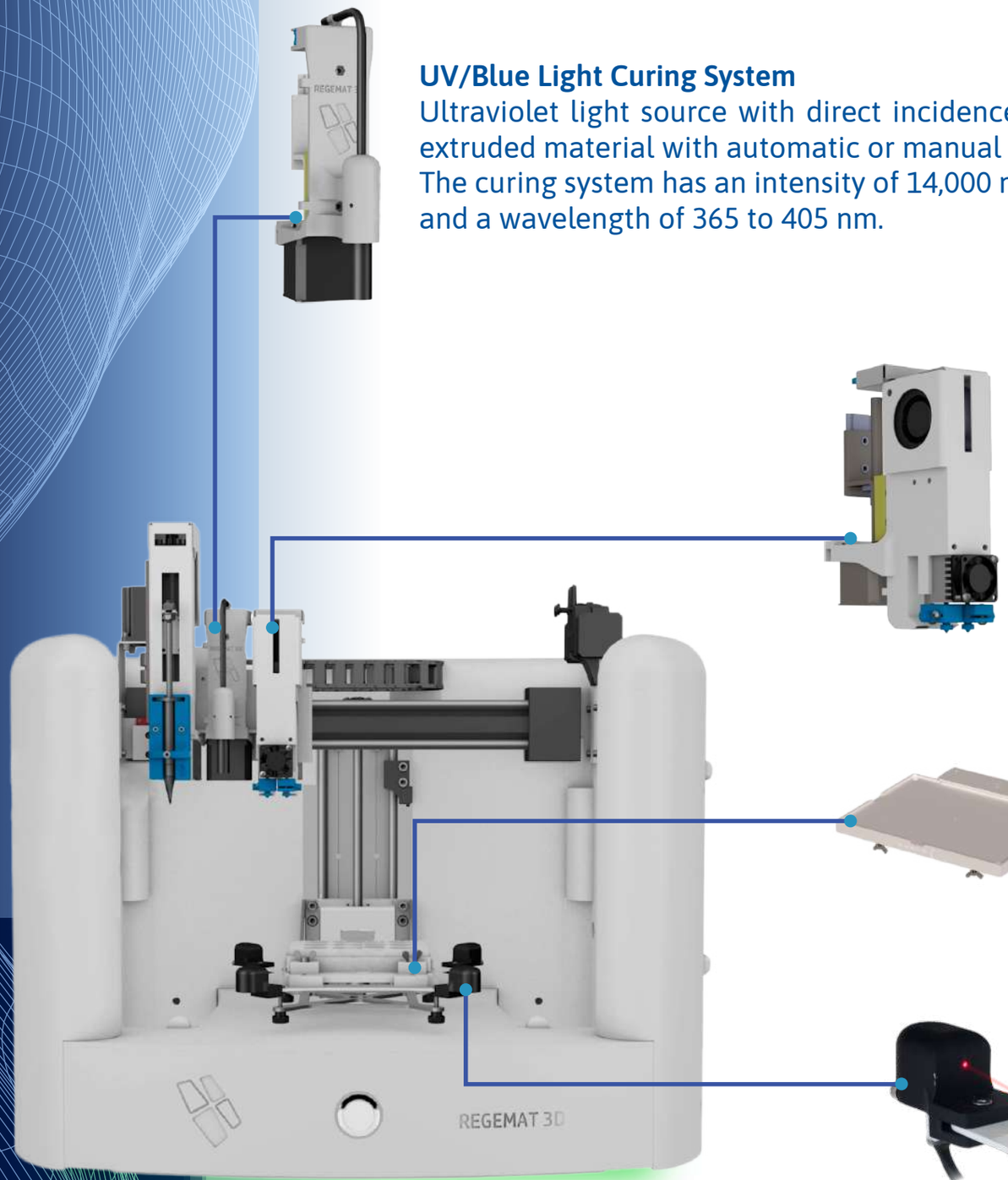
Exchangeable bioprinting tool, which posses a heating system by electric control. It achieves a homogeneous heat distribution through the extrusion system.

Coaxial Syringe

It consists of two syringes to print two types of materials simultaneously without mixing. It allows creating constructs in which the core and the external structure are made of different materials.

Heated Syringe comes as standard

Heating by means of an electrical system to distribute evenly the heat over its entire surface to keeps the stable temperature from 0 to 50 °C. It has electronic control of the filament created.



UV/Blue Light Curing System
Ultraviolet light source with direct incidence on the extruded material with automatic or manual control
The curing system has an intensity of 14,000 mW / cm and a wavelength of 365 to 405 nm.

Double thermoplastic extruder as standard
Double filament casting system for creating the layer-by-layer scaffold to print two different filaments during the same printing process.

Heated bed * as standard / Cooled
Uniform heating and /or cooling system over its entire surface that keeps the stable temperature in ranges between 0 and 120°C (heated bed) and -20 and 120°C (refrigerated bed) .

Laser sensors
High precision automatic calibration system for precise positioning of the nozzles.

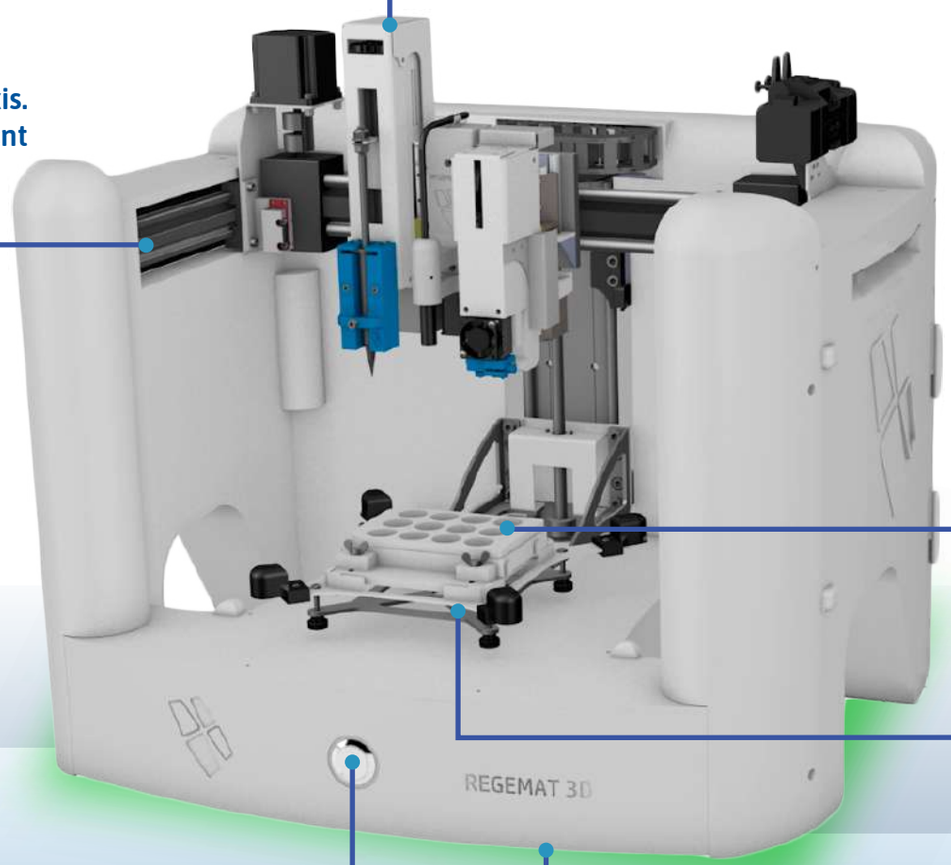
Technical Specifications

Display Reg4life

Complete structure of the print head

Belt movement in the X, Y and Z-axis. Independent spindle-activated movement for each component in the Z-axis.

Resolution 150 µm



Construction Volume

120mm x 120mm x 100mm

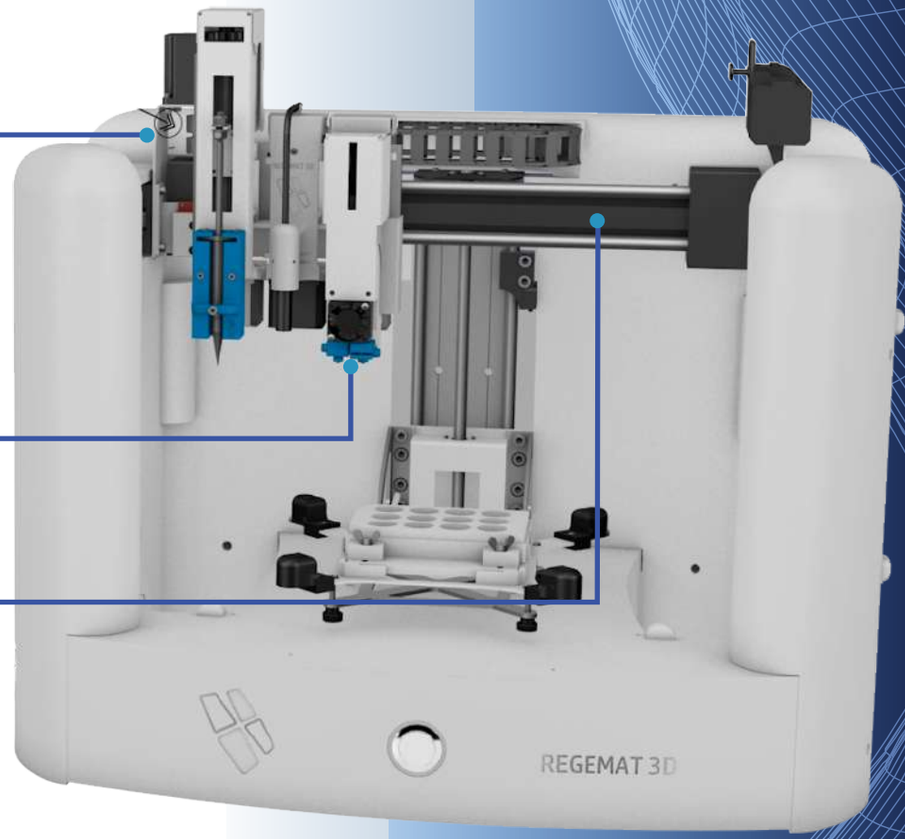
Mechanical displacement

with support with precision of 400nm in the Z axis.

Connection Switch.

Led-light indicator for bioprinting stage.

Print head fetures Reg4Life

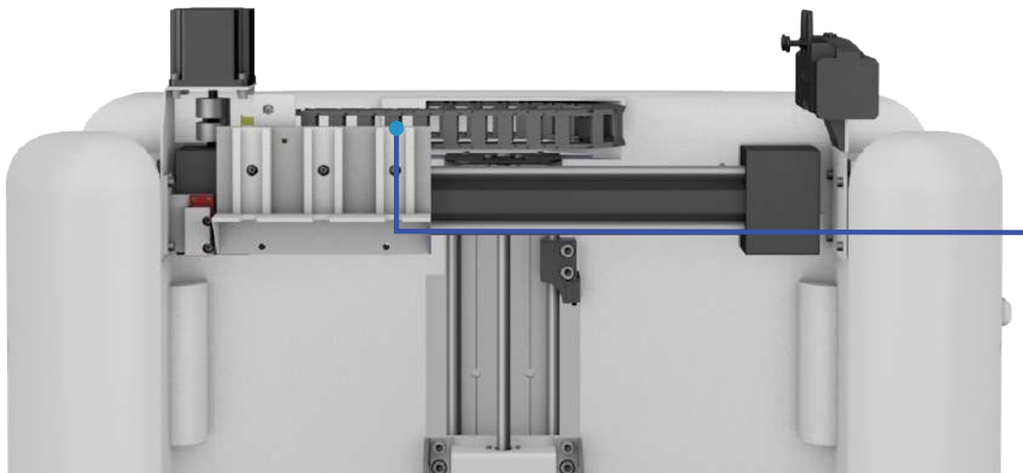


Manual purge system

Extrusion nozzle
Diameter of 400 um (=0.4 mm). Other diameters available for personalized configurations.

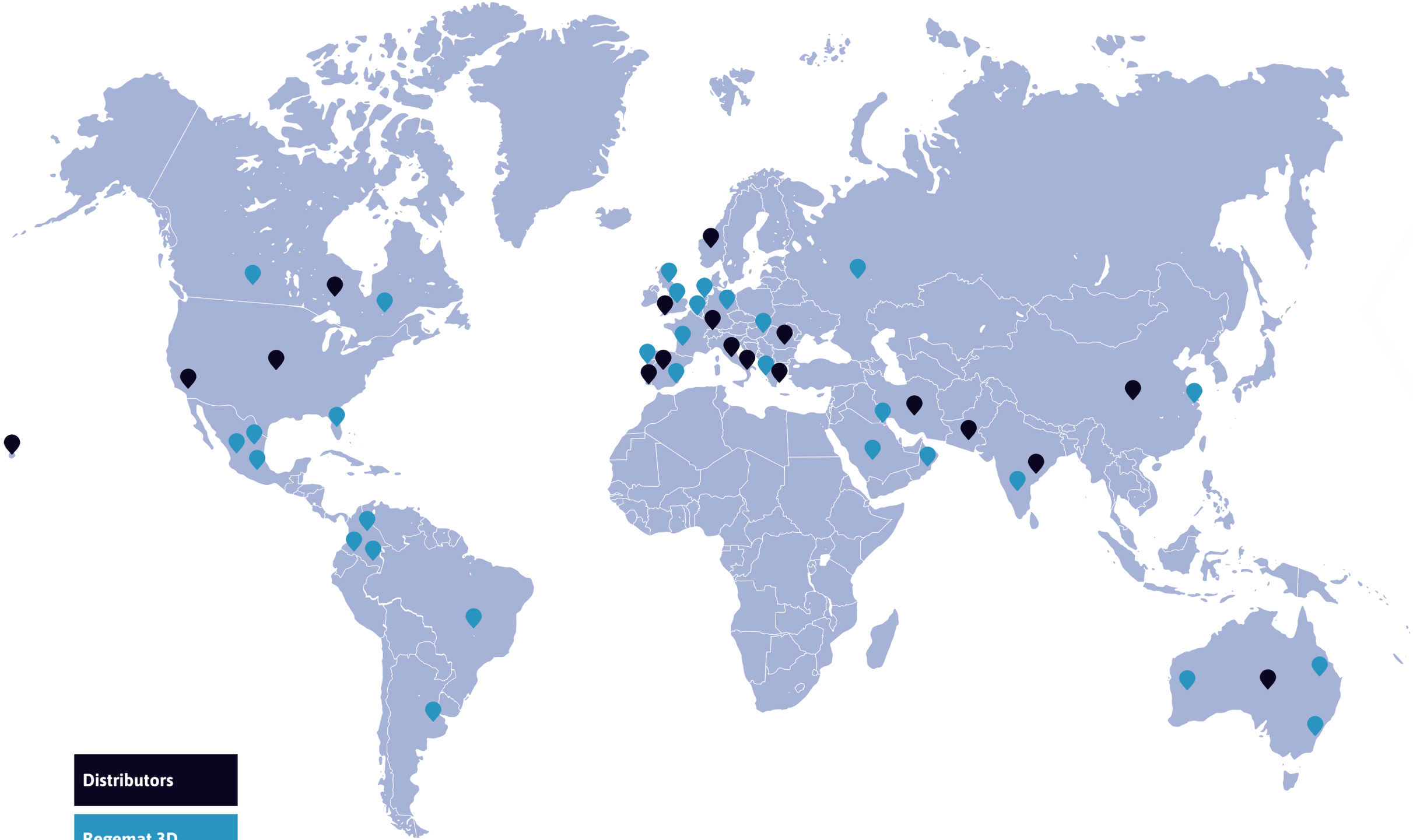
Displacement rail

Syringe nozzle diameter
Standard nozzles of 150 um (0.15mm), 250 um (0.25mm), 410 um (0.41 mm), 580 um (0.58 m).

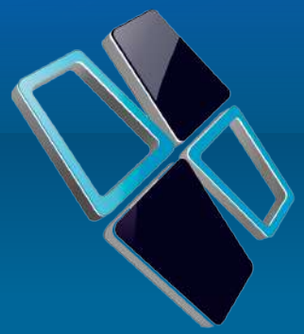


Adapter module for syringes
Incorporates an easy fast plug&play tool exchange system.

Regemat 3D and Distributors


Distributors
Regemat 3D

Being part of our community will give you private access to an online database where all our collaborators share their work in tissue engineering and regenerative medicine applications. This helps improving protocols and facilitate your work. Investigating by sharing experience is the best way to move faster and get results.



REGEMAT 3D

From researchers **to researchers.**

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