User Guidelines for

GEL-MA INX©X100

General Information

Storage

GEL-MA INX should be stored in a fridge at 4˚C until ready to use. Protect it from light. Expiry date of the product is indicated on the sealed pouch. The product can be stored for a maximum of 3 months after opening and should be consumed before the expiry date.

Intended Use

Research use only. This product is not intended for use in diagnostic or therapeutic procedures.

Safety Information

For more information, please refer to the material safety data sheet.

User Guidelines

Preparation

> ⚠️ GEL-MA INX X100 was produced under sterile conditions. To ensure optimal performance and prevent contamination, it is recommended to handle this product in a **sterile environment**.

1. Warm up the cartridge at room temperature for 20 min.
2. Pre-heat the printhead of the 3D printer at 27 °C.
3. Remove the end-cap and tip-cap of the cartridge and attach a printing nozzle. Insert the cartridge in the pre-heated printhead (27 °C), and warm up for at least 20 min before printing. (See processing guidelines for recommended nozzle types).

> ⚠️ For an optimal printing performance, the use of a metal conical **nozzle insulator** is required. Insert the nozzle tip in the insulator as shown in the image.

4. Calibrate the printhead and start printing using the suggested printing parameters (See processing guidelines)

GEL-MA INX X100

Processing

a) Recommended parameters for pneumatic-based printers

Recommended processing parameters for a pneumatic-based 3D printer are listed below.

	22G Nozzle	25G Nozzle	27G Nozzle
Nozzle geometry	Conical	Conical	Conical
Printhead Temperature	27 ± 0.5 °C	27 ± 0.5 °C	27 ± 0.5 °C
Printbed Temperature	16 ± 1 °C	16 ± 1 °C	16 ± 1 °C
Pressure	60 ± 20 kPa	70 ± 20 kPa	80 ± 20 kPa
Infill Speed	5 ± 1 mm/s	5 ± 1 mm/s	5 ± 1 mm/s
Layer Height	0.21 ± 0.02 mm	0.14 ± 0.02 mm	0.11 ± 0.02 mm

b) Recommended parameters for piston-based printers

Recommended processing parameters for a piston-based 3D printer are listed below.

	22G Nozzle	25G Nozzle	27G Nozzle
Nozzle geometry	Conical	Conical	Conical
Printhead Temperature	27 ± 0.5 °C	27 ± 0.5 °C	27 ± 0.5 °C
Printbed Temperature	16 ± 1 °C	16 ± 1 °C	16 ± 1 °C
Flow speed	3 ± 1 mm/s	3 ± 1 mm/s	3 ± 1 mm/s
Infill Speed	5 ± 1 mm/s	5 ± 1 mm/s	5 ± 1 mm/s
Layer Height	0.21 ± 0.02 mm	0.14 ± 0.02 mm	0.11 ± 0.02 mm

⚠️ The printing parameters have been validated for printing a cube with dimensions 15 x 15 mm (W x L) using 3 ml cartridges.

⚠️ Use of rectilinear infill pattern is recommended.

⚠️ **Photo-crosslinking:** During printing, structure should be irradiated with light (λ: 365 nm or 405 nm, Dose: 70 mJ/cm^2) after every five layers. This step is required for partial crosslinking of the structure for a better shape retention. After completion of printing, the final structure should be promptly placed under UV light for complete crosslinking. (Recommended parameters for post-printing photo-crosslinking: λ: 365 or 405 nm, Dose: 10000 mJ/cm^2)

For photo-crosslinking kinetics of GEL-MA INX at two different wavelengths, see Figure 1.
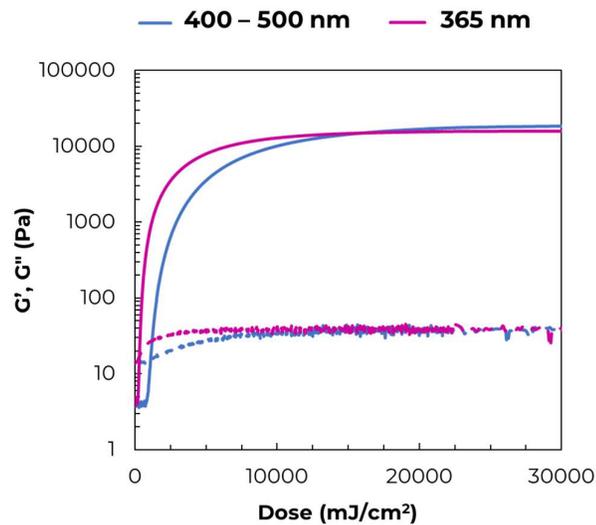
Figure 1. Storage (G', solid lines) and loss (G", dashed lines) moduli of GEL-MA INX X100 as a function of irradiation dose at 365 nm and 400-500 nm wavelengths

Cell Culture

a) Cell Seeding

The scaffolds can be readily seeded with cells after overnight incubation in cell culture media.

b) Cell Encapsulation

Preheat GEL-MA INX cartridge at 37 °C.

Connect GEL-MA INX cartridge to a syringe via a female luer-to-luer adapter.

Inject the desired amount of GEL-MA INX into the syringe.

Connect the second syringe containing the cell suspension via a luer-to-luer adapter. Shift the hydrogel back and forth between the syringes until the cells are homogeneously mixed in.

Inject cell-laden GEL-MA INX back into the cartridge via a luer-to-luer adapter.