BIOMATERIALS
REAGENTS
CONSUMABLES

Living tissues technologies

Palex
Constant Improvement

REGEMAT 3D

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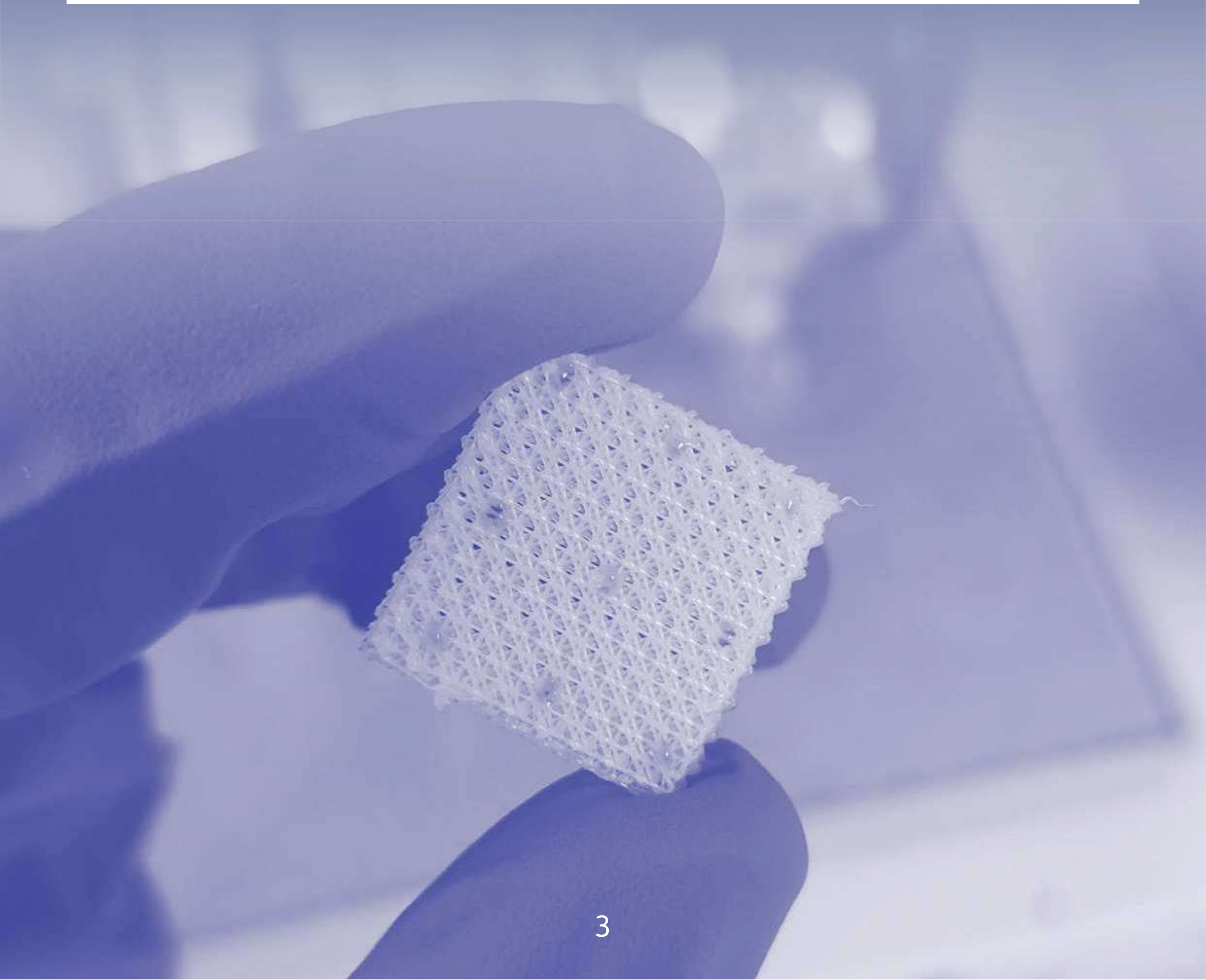
Thermoplastic

3D printing uses thermoplastic polymers in the form of filaments or pellets for the manufacture of 3D constructs, layer-by-layer, through fusion deposition modeling (FDM). Biocompatible thermoplastics are ideal for many applications in the biomedical sector: from the production of personalized drugs to the fabrication of scaffolds with tailorable properties for tissue engineering purposes.

REGEMAT 3D offers thermoplastics in different formats and sizes to cover all users' needs. Both filament and pellet forms can be customized to meet specific physicochemical, mechanical and biological properties. In addition, medical grade filaments can be provided on demand.



1 THERMOPLASTICS

Polylactic acid (PLA)

Polylactic acid (PLA) is a biodegradable, biocompatible and non-toxic thermoplastic polyester derived from renewable biomass products such as cornstarch or sugarcane. Thanks to its thermoplastic nature and excellent mechanical and biological properties, PLA and its copolymers are being widely used in the medical field in the form of devices and implants under the FDA approval.

This PLA filament is suitable for consumer-grade 3D fusion deposition modelling (FDM) printers. It exhibits fast crystallization rates and is able to develop improved heat resistance in 3D printed parts. The filament has excellent 3D printing characteristics such as good adhesion to build plates, less warping and curling, precise detail and low odour.

CHARACTERISTICS:
Diameter: 1.75 mm
Quantity: 250 g, 450 g or 1000 g
Printing temperature: 200 - 220 °C
Also available in medical grade.

ORDERING INFORMATION:

PLA filament (250 g)	RGMT001
PLA filament (450 g)	RGMT002
PLA filament (1 kg)	RGMT003

Polycaprolactone (PCL)

Polycaprolactone (PCL) is a biocompatible and biodegradable thermoplastic polyester used in many FDA-approved surgical implants and drug delivery devices for tissue engineering and regenerative medicine applications. In comparison to other thermoplastics such as PLA, PCL offers slower degradation times and higher flexibility, while maintaining the potential for load-bearing applications. These properties make it an ideal biomaterial for bone tissue engineering.

The low melting temperature of PCL allows for great malleability, 3D printing capacity, heat molding and shape memory. REGEMAT 3D offers PCL either in filament or pellet forms that are compatible with consumer-grade 3D FDM printers equipped with a filament or a pellet extruder, respectively.

CHARACTERISTICS:
PCL, pellet form
Diameter: ~3 mm
Quantity: 50 g or 250 g
Printing temperature: 60 - 145 °C

CHARACTERISTICS:
PCL, filament form
Diameter: 1.75 mm
Quantity: 750 g
Printing temperature: 60 - 145 °C
Also available in medical grade.

ORDERING INFORMATION:

PCL filament, natural color (750 g)	RGMT004
PCL pellets, natural color (250 g)	RGMT005
PCL pellets, natural color (500 g)	RGMT006

Flexible Thermoplastics

Filaflex Family

Filaflex is a family of thermoplastic polyether-polyurethane (TPU) elastomers used for the 3D printing of elastic and flexible scaffolds. A wide range of shore hardness (60A to 95A) is available for users looking for specific flexible projects or creations. In addition, electrically conductive Filaflex with shore hardness 92A has been specifically designed for the manufacture of electrically conductive scaffolds for applications in muskuloskeletal and neural tissue engineering and for the creation of wearable devices, amongst other applications.

Filaflex filaments contain additives that allow high printability in FDM 3D printers. They present high print bed adhesion, so they don't need a heated bed. The biomaterial presents good biocompatibility both in vitro and in vivo.

CHARACTERISTICS:
Diameter: 1.75 mm
Quantity: 250 g, 500 g
Shore hardness: Different models of elasticity available Printing temperature: 215 - 250 °C

ORDERING INFORMATION:

Filaflex 60A filament (250 g)	RGMT007
Filaflex 60A filament (500 g)	RGMT008
Filaflex 70A filament (250 g)	RGMT009
Filaflex 70A filament (500 g)	RGMT0010
Filaflex 82A filament (250 g)	RGMT0011
Filaflex 82A filament (500 g)	RGMT0012
Filaflex 95A filament (250 g)	RGMT0013
Filaflex 95A filament (500 g)	RGMT0014
Conductive Filaflex 92A filament (250 g)	RGMT0015
Conductive Filaflex 92A filament (500 g)	RGMT0016

Flexible Thermoplastics

Flexdym

Flexdym™ is a block co-polymer belonging to the SEBS (styrene-ethylene-butylene-styrene) family of thermoplastic elastomers which is specifically tailored for the fabrication of microfluidic devices and scaffolds for biomedical applications. FlexdymTM is a great alternative to PDMS for many reasons: it is certified biocompatible (ISO 10993 and USP Class VI); it has higher hydrophilic stability; and it is resistant to adsorption of small particles such as drugs or growth factors. Similar to PDMS, FlexdymTM is optically transparent and behaves as a soft elastomer (E = 1.15 MPa, Shore hardness = 35A).

Flexdym™ pellets enable the one-step automated fabrication of organ-on-a-chip and lab-on-a-chip devices via FDM through fast prototyping, thus avoiding the use of low cost-effective synthesis processes. Multi-step processes can be configured with REGEMAT 3D Designer software to print the devices with the pellet extruder and then add cell-laden hydrogels onto their surface with the syringe module.

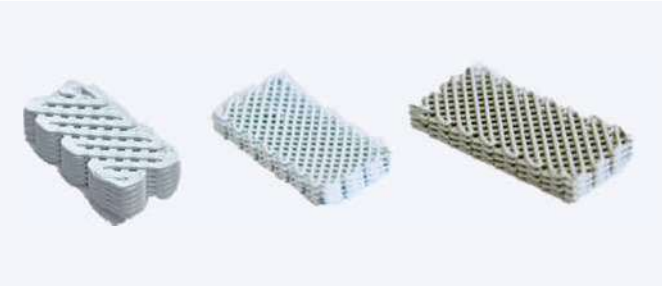
CHARACTERISTICS:
Diameter: ~ 5 mm
Quantity: 1 kg
Printing temperature: ~ 230 °C

ORDERING INFORMATION:

Flexdym pellets (1 kg)	RGMT017

Custom thermoplastics

Do you need a specific formulation? Then, we can provide you with thermoplastic filaments and pellets of tailor-made compositions for FDM on demand. Preparation of composite thermoplastics with commercially available ceramic, glass, metallic and hard metal particles or with your own synthetic particles has never been easier!
Filament-Oss (FOss)



CHARACTERISTICS:
Filament and pellet forms available
Diameter: 1.75 mm (filament), ~ 2 mm (pellet)
Quantity: 10 m (filament), 35 g (pellet)
Printing temperature: 155 - 165 °C

Filament-Oss

We offer the **FOss** line of filaments based on PLA with osseoinductive particles (magnesium -Mg- or hydroxyapatite -HA-) highly dispersed inside.

- **FOss HA**: composite material made of osseoinductive HA particles at concentrations ranging from 5 to 20%.
- **FOss HAsint**: composite material with a high content of HA particles. After printing the desired shape, the sintering process provides the user a 100% HA scaffold.
- **FOss Mg**: composite material made of osseoinductive Mg particles at concentrations ranging from 5-15%.

The **FOss** line enables the easy manufacturing of bone-inducing scaffolds with custom shapes. All filaments are bioactive and biodegradable, being suitable for tissue engineering applications.

Other available lines of custom PLA filaments are:

- **Filament-Eco** line, with dispersed catalytic particles such as titanium dioxide (TiO_2), zinc oxide (ZnO) and carbon-derived forms (graphite and graphene)
- **Filament-Cer** line, with Aluminium oxide (Al_2O_3) and zirconium oxide (ZrO_2) ceramic particles highly dispersed.

Don't you find what you are looking for in our advanced lineup of custom thermoplastics? Do you need a specific formulation or a unique color filament?

Ask for a custom formulation! Our experienced team of engineers will develop a filament or pellet perfectly matching your needs.

ORDERING INFORMATION:

FOss HA 5% filament (10 m)	RGMT018				
FOss HA 10% filament (10 m)	RGMT019	FOss Mg 10%, filament (10 m)	RGMT024	FOss HA 20% pellets (35 g)	RGMT029
FOss HA 15% filament (10 m)	RGMT020	FOss Mg 15%, filament (10 m)	RGMT025	FOss HASint 50% pellets (35 g)	RGMT030
FOss HA 20% filament (10 m)	RGMT021	FOss HA 5% pellets (35 g)	RGMT026	FOss Mg 5% pellets (35 g)	RGMT031
FOss HASint 50% filament (10 m)	RGMT022	FOss HA 10% pellets (35 g)	RGMT027	FOss Mg 10% pellets (35 g)	RGMT032
FOss Mg 5%, filament (10 m)	RGMT023	FOss HA 15% pellets (35 g)	RGMT028	FOss Mg 15% pellets (35 g)	RGMT033

Other thermoplastics

We can supply other thermoplastics upon demand. Different quantities available.

• **Acrylonitrile butadiene styrene (ABS)** is ideal for objects that require toughness and durability. This 3D printing filament has been manufactured using ABS that meet the requirements of USP Class VI or ISO 10993-1 certification, which guarantees its biocompatibility in contact with the human body. This ABS is also valued for its food safety properties, complying with EU regulations.

• **Polyethylene terephthalate glycol (PETG)** is a highly traslucent thermoplastic copolyester with high chemical resistance and durability. It combines both the simplicity of PLA 3D printing with the strength of ABS. This 3D printing filament has USP Class VI or ISO 10993-1 certification for biocompatibility with the human body, which makes it a suitable material for the medical sector. This PETG is also valued for its food safety properties, complying with EU regulations.

• **Polypropylene (PP)** is a transparent, light and flexible material, with excellent mechanical and chemical resistance. The high versatility of the material makes it suitable for many industrial applications. This 3D printing filament contains special additives to improve its adhesion to the printing surface.

• **Polyvinyl alcohol (PVA)** is a biodegradable, non-toxic and water-soluble filament used to create support structures to achieve complex geometries with multi-extrusion printers. After printing, PVA can be easily removed by immersing the construct in water.

ORDERING INFORMATION:

ABS filament (750 g)	RGMT034
PETG filament (750 g)	RGMT035
PP filament (700 g)	RGMT036

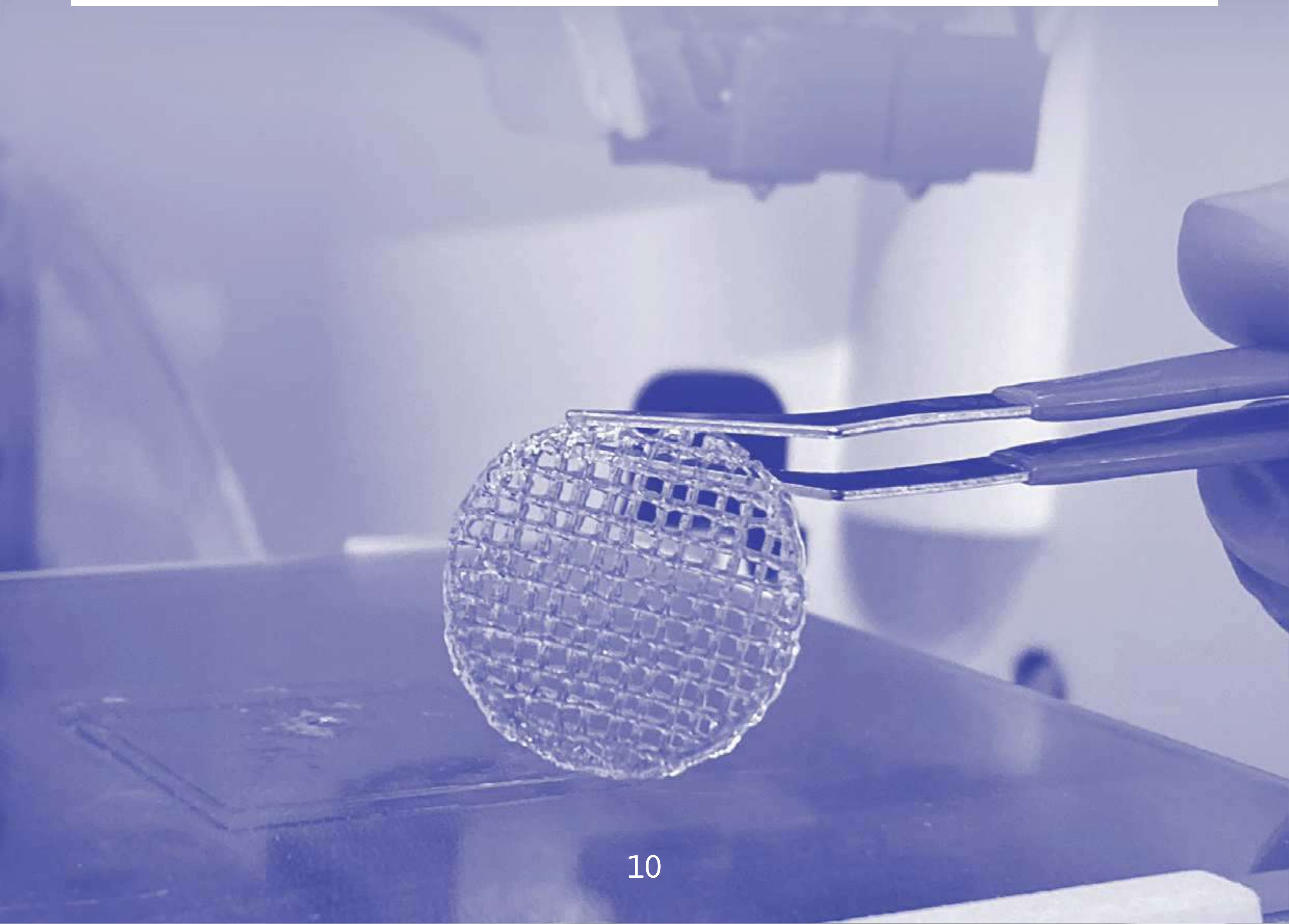
PVA filament (350 g)	RGMT037
PVA filament (750 g)	RGMT038

Hydrogels

Selection of the proper bioink for each 3D bioprinting application is crucial, since it will determine the overall quality and functionality of the construct. Hydrogels are a natural choice of bioink materials for the printing of either acellular or cell-laden scaffolds for many applications.

REGEMAT 3D offers a wide variety of naturally derived and synthetic hydrogels for the preparation of bioinks 100% compatible with REGEMAT 3D Bio V1 and REG4Life bioprinters, as well as with other extrusion-based bioprinting systems. Different formats and sizes are available to suit all your needs, from lyophilized biomaterials to ready-to-use cartridges.

Ensuring the 3D bioprinting of cell-laden hydrogels with high precision and shape fidelity, whilst maintaining cell survival and function, has always been our priority. The offered hydrogels have been thoroughly tested by our researchers and industrial partners, yielding the best results in a wide range of applications.



ECM-based hydrogels

Naturally derived hydrogels from decellularized tissues have a remarkable potential for clinical translation. They have the advantage of providing the cells with all the necessary instructions for their growth and differentiation.

HumaMatrix

PRODUCT OVERVIEW:

HumaMatrix is one of the first commercially available native human-derived extracellular matrix (ECM) products. HumaMatrix is isolated from nutrient-rich human tissue sourced strictly from American Association of Tissue Banks (AATB) and Organ Procurement Organizations (complying with FDA 21 CFR Part 1271 requirements), following a proprietary manufacturing method to preserve native matrix proteins including collagen, elastin, laminin, glycosaminoglycans and many others, as well as growth factors.

INTENDED USE:

HumaMatrix is an alternative to Matrigel and it is ideal for many applications including the coating of tissue culture surfaces and the preparation of bioinks for 3D bioprinting. Among other applications, HumaMatrix can be specifically used for the culture of organoids under more realistic 3D microenvironments. Its human origin avoids clinical concerns associated with the use of xeno-derived biomaterials while enhances the relevance and clinical translation of the results.

ORDERING INFORMATION:

HumaMatrix - Native Human-Derived ECM, Lyophilized (10 mg)	RGMB001
HumaMatrix - Native Human-Derived ECM, Lyophilized (50 mg)	RGMB002
HumaMatrix - Native Human-Derived ECM, Lyophilized (100 mg)	RGMB003
HumaMatrix - Native Human-Derived ECM, 10 mg/ml Solution (5 ml)	RGMB004
HumaMatrix - Native Human-Derived ECM, 10 mg/ml Solution (10 ml)	RGMB005
HumaMatrix- Native Human Derived ECM 10 mg/ml Solution (25 ml)	RGMB006
HumaMatrix - Native Human-Derived ECM, 20 mg/ml Solution (5 ml)	RGMB007
HumaMatrix - Native Human-Derived ECM, 20 mg/ml Solution (10 ml)	RGMB008
HumaMatrix - Native Human-Derived ECM, 20 mg/ml Solution (25 ml)	RGMB009
HumaMatrix Coat - Native Human-Derived ECM, 1 mg/ml Solution (10 ml)	RGMB010
HumaMatrix Coat - Native Human-Derived ECM, 1 mg/ml Solution (25 ml)	RGMB011

Collagens

Collagen is the most abundant structural protein in the ECM, accounting for 30% of the total body protein content in humans. Amongst the 28 types of collagen that have been already identified, collagen type I is the most abundant by far, playing its most prominent functional roles in the skin and bone, and to a lesser extent in the ECM of other tissues.

ColBioink

PRODUCT OVERVIEW:
ColBioink is a sterile solution of highly purified collagen type I from porcine origin. It can be used either straightaway to print 3D scaffolds or being loaded with suspended cells to print cell-laden structures after its neutralization.

INTENDED USE:
ColBioink is compatible with FDM, IPF (Injection Pore Filling) and IVF (Injection Volume Filling) printing modalities of REGEMAT 3D bioprinting systems. The high viability and cellular functions of encapsulated cells are ensured in long-term cultures with ColBioink. Its high content in atellocollagen ensures low immunogenicity, making it a safe material for many tissue engineering application including the manufacture of cartilage, skin and cornea tissue-like constructs.

ORDERING INFORMATION:

ColBioink kit	RGMB012

Collagens

Fibercoll-Flex Bioinks

FIBERCOLL-FLEX^{A} BIOINK

PRODUCT OVERVIEW:
Fibercoll-Flex^{A} is made of acidic collagen type I fibers from bovine dermis that can be neutralized after printing.

INTENDED USE:
Ideal for the fabrication of robust scaffolds through 3D printing. Depending on the intended purpose, stiffness of the printed product can be regulated by adjusting Fibercoll-Flex^{A} working concentration. Cells can be seeded onto the scaffolds after their neutralization with NaOH. No crosslinking steps are required.

FIBERCOLL-FLEX^{N} BIOINK

PRODUCT OVERVIEW:
Fibercoll-Flex^{N} bioink is made of acidic collagen type I fibers from bovine dermis than can be easily neutralized immediately before printing, so it can be used in the bioprinting of cell-laden hydrogels.

INTENDED USE:
Ideal for many applications, including generation of complex tissue and tumor models through 3D bioprinting. Depending on the intended purpose, stiffness of the printed product can be regulated by adjusting Fibercoll-Flex^{N} working concentration. The bioink is printable at physiological conditions of pH and temperature, thus enhancing cell survival during bioprinting. No crosslinking steps are required.

ORDERING INFORMATION:

FiberColl-Flex^{A} Bionk kit (3 ml)	RGMB013
FiberColl-Flex^{N} Bionk kit (3 ml)	RGMB014

Collagens

HumaDerm and its derivatives

PRODUCT OVERVIEW:
Native type I collagen isolated from human skin sourced strictly from American Association of Tissue Banks and Organ Procurement Organizations (complying with FDA 21 CFR Part 1271 requirements), following a proprietary manufacturing method to preserve the collagen from the native tissue. **HumaDerm** is available in different forms.

- **HumaCoat**: native type I collagen at low concentration
- **HumaDerm**: native type I collagen at high concentration
- **HumaDerMA**: methacrylated form with photo crosslinking capability

INTENDED USE:
HumaDerm and its derivatives are ideal for many applications including surface coating to support cell attachment and growth (HumaCoat), and for 3D cell culture and 3D bioprinting applications (HumaDerm and HumaDerMA). HumaDerm allows for printing stable tissue constructs using FRESH bioprinting techniques and the formation of mature and functional human vessels, among other features, while HumaDerMA has the ability to form clear hydrogels with tunable mechanical properties. The human origin avoids clinical concerns associated with the use of xeno-derived biomaterials while enhances the relevance and clinical translation of the results.

ORDERING INFORMATION:

HumaDerm - Human Skin Collagen Type I, Lyophilized (25 mg)	RGMB015
HumaDerm - Human Skin Collagen Type I, Lyophilized (50 mg)	RGMB016
HumaDerm - Human Skin Collagen Type I, Lyophilized (100 mg)	RGMB017
HumaDerm - Human Skin Collagen Type I, 3 mg/ml Solution (10 ml)	RGMB018
HumaDerm - Human Skin Collagen Type I, 3 mg/ml Solution (20 ml)	RGMB019
HumaDerm - Human Skin Collagen Type I, 6 mg/ml Solution (10 ml)	RGMB020
HumaCoat - Human Skin Collagen Type I, 1 mg/ml Solution (10 ml)	RGMB021
HumaDerMA - Human Skin Collagen Type I Mehtacrylate, Lyophilized (25 mg)	RGMB022
HumaDerMA - Human Skin Collagen Type I Mehtacrylate, Lyophilized (50 mg)	RGMB023
HumaDerMA - Human Skin Collagen Type I Mehtacrylate, Lyophilized (100 mg)	RGMB024

Gelatins

Gelatins are obtained from animal and human sources through the physical or chemical denaturation of collagen. Gelatin-based hydrogels have a broad range of applications in tissue engineering due to their biocompatibility, biodegradability and their convenience for chemical modifications to enhance their thermal stability and mechanical properties.

Claro™ BG800

PRODUCT OVERVIEW:

Claro™ BG800 is a freeze-dried porcine gelatin-based bioink modified with methacryloyl groups (GelMA) exhibiting rheological properties tailored for extrusion-based bioprinting. BG800 overcomes clogging, and the poor shape-fidelity observed with regular GelMA products without affecting the intrinsic biocompatibility of gelatin and gel strength of the matrix. BG800 is crosslinkable under UV or visible light (depending on the photoinitiator used in the formulation) using REGEMAT 3D light curing modules. BG800 is produced under high-quality standards of purification, ensuring ultra-low levels of impurities such as methacrylic acid and guaranteeing batch-to-batch consistency.

INTENDED USE:

Engineering of a vast range of tissues such as bone, cardiac and neural tissue due to its excellent biocompatibility, biodegradability and tunable mechanical properties.

ORDERING INFORMATION:

3 x 500 mg containers	RGMB025
6 x 500 mg containers	RGMB026
12 x 500 mg containers	RGMB027

Gelatins

GEL-MA INX R100

PRODUCT OVERVIEW:
GelMA-based hydrogel, derived from natural collagen. It retains RGD motifs in its backbone, thus promoting cell interactions and showing good biocompatibility.

GEL-MA INX© R100 has been developed exclusively for and is totally compatible with REGEMAT 3D bioprinting systems. It can be printed by taking advantage of its temperature-dependent physical gelation behavior. It is supplied in a ready-to-use cartridge, which already contains a photoinitiator that can efficiently be activated at wavelengths of 365 and 405 nm. After photo-crosslinking with REGEMAT 3D light curing modules, the material becomes physiologically stable, exhibiting sufficient mechanical integrity to maintain shape fidelity.

INTENDED USE:
This biodegradable, cell-interactive, extracellular matrix-mimicking hydrogel has already shown compatibility for a whole range of tissues including blood vessels, adipose, brain, cartilage, bone, connective, skin and ocular tissue.

ORDERING INFORMATION:

GEL-MA INX R100 (3 ml)	RGMB028
GEL-MA INX R100 (5 ml)	RGMB029

Gelatins

EASYGEL INX R100

PRODUCT OVERVIEW:
Gelatin-based hydrogel derived from natural collagen, which has been modified with photo-crosslinkable functional groups.

EASYGEL INX© R100 has been developed exclusively for and is totally compatible with REGEMAT 3D bioprinting systems. It can be printed with unprecedented efficiency, since it combines all the benefits of conventional GelMA-based bioinks with a highly improved printing process, thanks to its shear thinning behavior. It is supplied in a ready-to-use cartridge, which already contains a photoinitiator. After printing, the bioink can be photo-crosslinked at wavelengths of 365 nm and 405 nm with REGEMAT 3D light curing modules, resulting in a hydrogel with sufficient mechanical integrity to generate stable 3D constructs with high shape fidelity.

INTENDED USE:
This biodegradable, cell-interactive, extracellular matrix-mimicking hydrogel has been used to generate and sustain 3D cellular constructs of a variety of human cell types, including adipose-derived stem cells and human foreskin fibroblasts.

ORDERING INFORMATION:

EASYGEL INX R100 (3 ml)	RGMB030
EASYGEL INX R100 (5 ml)	RGMB031

Gelatins

Huma OsteoGelatin and its derivatives

PRODUCT OVERVIEW:

Huma OsteoGelatin is the first and only human bone-derived gelatin in the market, at bloom numbers between 90-300 g. It has been extracted and purified from human bone tissue sourced strictly from American Association of Tissue Banks (AATB) and Organ Procurement Organizations (complying with FDA 21 CFR Part 1271 requirements), following a proprietary manufacturing method. Human gelatin is also available in its methacrylated form, **Huma OsteoGelMA**, with photo-crosslinking capability to tune its mechanical properties for tissue engineering applications.

INTENDED USE:

Huma OsteoGelatin and its derivatives have been manufactured to meet regenerative medicine needs and boost translational research. Human OsteoGelatin is ideal for coating tissue culture surfaces with a thin layer of gelatin to support rapid cell attachment and growth and can be used to generate and sustain 3D structures of a variety of human tissues. Huma OsteoGelMA enables the 3D bioprinting of strong and clear 3D constructs. Gelatins can be combined with other human-derived biomaterials, such as HumaDerm, to make completely

ORDERING INFORMATION:

Huma OsteoGelatin - Human Bone Gelatin, Medium Bloom ~225 g, Lyophilized (100 mg)	RGMB032
Huma OsteoGelatin - Human Bone Gelatin, Medium Bloom ~225 g, Lyophilized (250 mg)	RGMB033
Huma OsteoGelatin - Human Bone Gelatin, Medium Bloom ~225 g, Lyophilized (500 mg)	RGMB034
Huma OsteoGelatin - Human Bone Gelatin, Medium Bloom ~225 g, Lyophilized (1 g)	RGMB035
Huma OsteoGelatin - Human Bone Gelatin, Medium Bloom ~225 g, Lyophilized (5 g)	RGMB036
Huma OsteoGelatin - Human Bone Gelatin, High Bloom ~300 g, Lyophilized (100 mg)	RGMB037
Huma OsteoGelatin - Human Bone Gelatin, High Bloom ~300 g, Lyophilized (250 mg)	RGMB038
Huma OsteoGelatin - Human Bone Gelatin, High Bloom ~300 g, Lyophilized (500 mg)	RGMB039
Huma OsteoGelatin - Human Bone Gelatin, High Bloom ~300 g, Lyophilized (1 g)	RGMB040
Huma OsteoGelatin - Human Bone Gelatin, High Bloom ~300 g, Lyophilized (5 g)	RGMB041
Huma OsteoGelMA - Human Gelatin Methacrylate, Medium Bloom ~225 g, Lyophilized (1 g)	RGMB042
Huma OsteoGelMA - Human Gelatin Methacrylate, High Bloom ~300 g, Lyophilized (1 g)	RGMB043

Polysaccharides

Polysaccharides and their derivatives are highly attractive biomaterials in the field of regenerative medicine owing to their xeno-free nature, low cytotoxicity, hydrophilicity and high mechanical strength.

Agarose

PRODUCT OVERVIEW:

Agarose is a linear polysaccharide extracted from red seaweed, which is widely employed in gel electrophoresis. Agarose can be used as bioink due to its high biocompatibility, biodegradability, physical and mechanical properties. The printing of cell-laden structures is feasible with this formulation due to its unique gelling properties: while the solution remains fluid at physiological temperature (37 °C), it rapidly solidifies at temperatures below 25 °C. No additional crosslinking steps are required for the printing of complex shapes.

INTENDED USE:

Agarose-based biomaterials are widely used for the culture of spheroids, for the preparation of advanced drug delivery systems and for tissue engineering purposes. Agarose can be mixed with other biomaterials such as sodium alginate or fibrin to enhance the mechanical strength and biological performance of the final 3D printed constructs. Agarose and alginate blends provide support for chondrogenesis, while blends of agarose and fibrin have been widely used for skin, cornea and neural tissue engineering, amongst others.

ORDERING INFORMATION:

Low melting point ultrapure agarose (50 g)	RGMB044
Low melting point ultrapure agarose (100 g)	RGMB045

Polysaccharides

Sodium Alginate

PRODUCT OVERVIEW:
Sodium alginate is a FDA-approved natural polysaccharide extracted from brown algae. Its outstanding features including high biocompatibility, ease of gelation, tailorable rheological properties and degradation kinetics make it an ideal candidate for 3D bioprinting applications.

Together with alginate concentration, Mw and mannuronic to guluronic acid (M/G) ratio are well-known to be crucial in determining the shear thinning behavior of the bioink and thereof, its extrudability and shape-fidelity. For this reason, these parameters have been optimized in this formulation to achieve unprecedented results in 3D bioprinting. Alginate hydrogels can be ionically crosslinked with various divalent cations including $CaCl_2$ (RGMCA-005).

INTENDED USE:
Sodium alginate has multiple applications in the food, cosmetic and biomedical industries. 3D bioprinting of a wide variety of tissues including cartilage or skin has been achieved using sodium alginate, alone, enriched with additives or in combination with other biomaterials such as collagen or nanocellulose, to improve its biological and mechanical performance.

ORDERING INFORMATION:

Sodium alginate (50 g)	RGMB046
Sodium alginate (100 g)	RGMB047
Sodium alginate (1 kg)	RGMB048

Polysaccharides

Nanocellulose Corbiocel

PRODUCT OVERVIEW:
Corbiocel is a hydrogel made of cellulose nanofibrils (CNF) which have been formed by a size reduction process of native cellulose fibers, obtained from Eucalyptus globulus kraft pulp, through TEMPO-mediated oxidation. Cellulose is the most plentiful, renewable biopolymer resource with great promise in most industrial sectors and is grabbing lot of attention in tissue engineering, due to its robust mechanical properties, excellent biological properties (high biocompatibility, low biodegradability, low immunogenicity and non-cytotoxicity), and cost-effectiveness.

INTENDED USE:
Due to its high viscosity even at low concentrations, **Corbiocel** can be 3D printed solely in a straightforward manner, without the need of crosslinking steps, or can be also combined with other biomaterials such as sodium alginate or GelMA. The most remarkable applications of nanocellulose in the biomedical field include cartilage tissue engineering, fabrication of wound dressings and tailored drug delivery platforms.

ORDERING INFORMATION:

Corbiocell nanocellulose (10 ml)	RGMB049

Synthetic inks

Synthetic hydrogels are chemically defined animal component and pathogen - free hydrogels with tailored mechanical and rheological properties for 3D bioprinting. Their synthetic origin avoid batch to batch variations, giving users the confidence to achieve reliable and consistent results with potential for clinical translation.

STABLE INX R100

PRODUCT OVERVIEW:
STABLE INX© R100 is a synthetic cell-interactive and non-biodegradable hydrogel. STABLE INX© R100 is developed exclusively for and is totally compatible with REGEMAT 3D bioprinting systems. The efficiency of the printing process is highly improved thanks to the shear thinning behavior of STABLE INX©. After printing, the hydrogel can be photo-crosslinked with REGEMAT 3D light curing modules, either at 365 or 405 nm wavelengths, resulting in a flexible yet strong hydrogel (G' = 250 - 1000 kPa) which enables load-bearing applications.

INTENDED USE:
This product has been used to generate and sustain 3D cellular structures such as human foreskin fibroblasts and for engineering a variety of human tissues, including bone. cornea and neural tissue engineering, amongst others.

SUPPORT INX R100

PRODUCT OVERVIEW:
SUPPORT INX© R100 is a synthetic temperature-stable sacrificial ink which exhibits high biocompatibility as determined by contact toxicity evaluation. SUPPORT INX© R100 has been developed exclusively for and is 100% compatible with REGEMAT 3D bioprinting systems. The efficiency of the printing process has been improved due to its shear thinning-behavior. After printing, the scaffold can be removed by washing in deionized water.

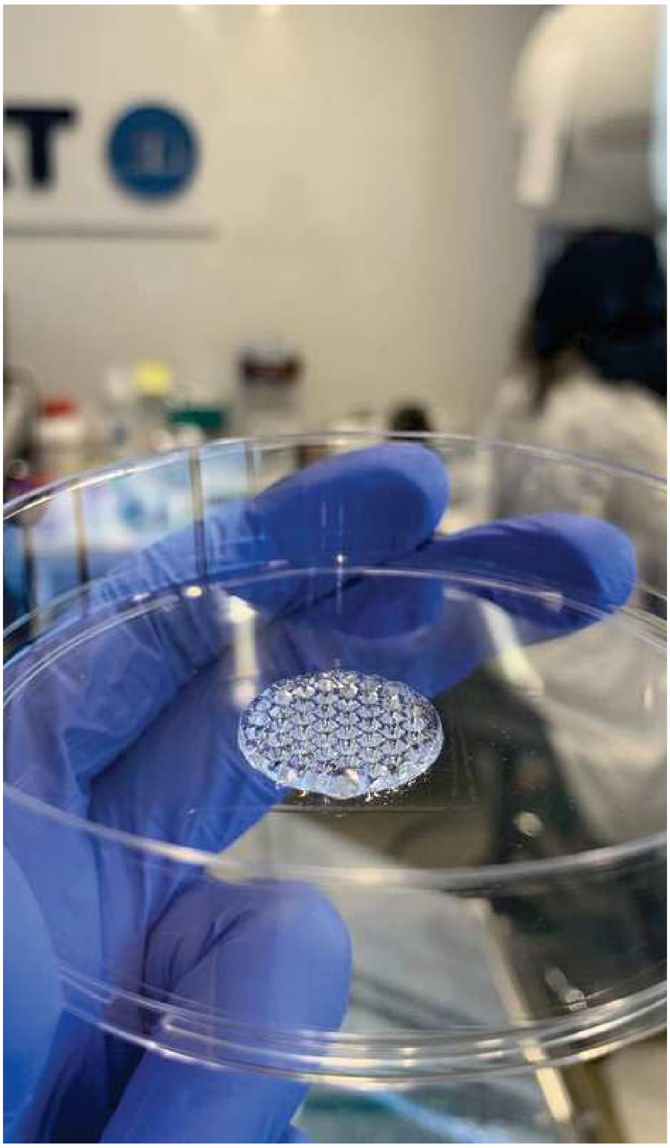
INTENDED USE:
Given to its pH and temperature stability, this product has been used to generate and sustain 3D structures of a variety of human tissues, including the printing of channel structures for vascularization.

ORDERING INFORMATION:

STABLE© INX R100 (3 ml)	RGMB050
STABLE© INX R100 (5 ml)	RGMB051

SUPPORT INX R100 (3 ml)	RGMB052
SUPPORT INX R100 (5 ml)	RGMB053

Custom hydrogels



PRODUCT OVERVIEW:
Although most hydrogels have excellent biocompatibility and provide exceptional support for a wide variety of tissues, their functionalization with specific bioactive moieties can be advantageous for the engineering of specific tissues and organs.

INTENDED USE:
We offer an on-demand service for the functionalization of a variety of hydrogels with a proprietary technology that ensures even incorporation and optimal presentation of the functional molecules throughout the polymer chains of the different biomaterials comprising the hydrogels.

The different available moieties include but are not limited to:

- Fibronectin-derived: RGD
- Laminin-derived: YIGSR & IKVAV -
- Glycocalyx-mimicking: Carboxybetaine
- Osteoinductive: Phosphoserine
- Oxygen-quenching: Quinolone

Please inquire for the incorporation of additional personalized bioactive moieties.

Polymerization initiators

Some hydrogels require the addition of crosslinking agents to form an insoluble 3D network structure. REGEMAT 3D offers high purity photoinitiators for the physical crosslinking of hydrogels in the presence of light of different wavelengths as well as chemical agents for the ionic crosslinking of hydrogels.

IRGACURE 2959 and LAP

IRGACURE 2959

PRODUCT OVERVIEW:
2-Hydroxy-4'-(2-hydroxyethoxy)-2-methylpropiophenone (IRGACURE 2959) is a radical photoinitiator which can efficiently be activated with 365 nm UV light. It is widely used for the crosslinking of a number of photocurable biomaterials in order to create hydrogels or bioinks for 3D bioprinting and tissue engineering purposes. As Irgacure 2959 is not water soluble, it must be solubilized in organic solvents such as methanol.

INTENDED USE:
This product may be used in combination with the methacrylated collagens (HumaDerMA) or gelatins (Claro™ BG800, Huma OsteoGelMA) in our catalogue and REGEMAT 3D UV light (365 nm) curing module for the fabrication of photopolymerizable GelMA-based bioinks for the engineering of a vast range of tissues such as bone, cardiac and neural tissue. Irradiation dose may be adjusted to obtain constructs with the desirable mechanical properties while minimizing cell damage.

LAP

PRODUCT OVERVIEW:
Lithium phenyl-2,4,6-trimethylbenzoylphosphinate (LAP) is a water soluble, cytocompatible, type I photoinitiator used in the polymerization of hydrogels or other water-soluble polymeric materials. LAP is preferred for biological applications over Irgacure 2959 due to its increased water solubility, increased polymerization at 365 nm, and the capacity of polymerization at 405 nm (visible light). These properties allow for a reduction of the required concentration for crosslinking and the use of longer wavelengths, which have been shown to reduce cytotoxicity and increase cell viability.

INTENDED USE:
This product may be used in combination with the methacrylated collagens (HumaDerMA) or gelatins (Claro™ BG800, Huma OsteoGelMA) in our catalogue and REGEMAT 3D UV light (365 nm) and visible light (405 nm) curing modules for the fabrication of photopolymerizable GelMA-based bioinks for the engineering of a vast range of tissues such as bone, cardiac and neural tissue. Irradiation dose may be adjusted to obtain constructs with the desirable mechanical properties while minimizing cell damage.

ORDERING INFORMATION:

Irgacure 2959 ≥ 98% purity (10 g)	RGMCA001
LAP ≥ 95% purity (10 g)	RGMCA002

RU(BPY)3 and SPS

PRODUCT OVERVIEW:

Tris (2,2'-bipyridyl) dichlororuthenium (II) hexahydrate (RU(BPY)3) is a metal complex, water soluble photoinitiator, suitable for its use under visible light wavelengths (> 400 nm, with higher activation at 450 nm). In order to be used as a photoinitiator, it should be combined with **Sodium Persulfate (SPS)** (sold separately). It has been utilized to crosslink free tyrosine and acryl groups of Collagen type I, Gelatin, their methacrylated derivatives, silk fibroin, HAMA, and PEGDA, amongst other biomaterials. It is non-toxic for cells at high concentrations and at visible light intensities of 3-100 mW/cm2.

INTENDED USE:

This product may be used in combination with the methacrylated collagens (HumaDerMA) or gelatins (Claro™ BG800, Huma OsteoGelMA) in our catalogue and REGEMAT 3D visible light curing module for the fabrication of photopolymerizable GelMA-based bioinks for the engineering of a vast range of tissues such as bone, cardiac and neural tissue. Irradiation dose can be adjusted to obtain constructs with the desired mechanical properties.

ORDERING INFORMATION:

Ru(BPY)3 > 98 % purity (250 mg)	RGMCA003
SPS ≥ 98 % purity (25 g)	RGMCA004

Calcium Chloride ($CaCl_2$)

PRODUCT OVERVIEW:
Calcium chloride ($CaCl_2$) is the most conventional choice of ionic crosslinker for alginate-based bioinks due to its high solubility in aqueous solution and rapid gelation reaction. It can be used either at 50 mM or 100 mM concentrations, bridging alginate molecules within few minutes.

INTENDED USE:
$CaCl_2$ reagent may be used for the ionic crosslinking of alginate-based bioinks during or after 3D bioprinting, using coaxial or conventional extrusion syringes, respectively. Fabricated 3D constructs are optically transparent, present good mechanical properties and are suitable for many applications.

ORDERING INFORMATION:

Calcium chloride, 1M solution (100 ml)	RGMCA005

Consumables

High-quality consumables are a must for achieving high-precision 3D bioprinting. REGEMAT 3D offers first-class consumables dedicated for its bioprinters to ensure meeting the highest standards of quality for its customers.

Syringe barrels



PRODUCT OVERVIEW:

Syringe barrels compatible with REGEMAT 3D bioprinters are designed each as a part of an integrated system specifically envisaged for the precise and repeatable deposition of fluids, allowing for accurate 3D printing of hydrogels and bioinks.

CHARACTERISTICS:

These syringe barrels are fabricated with a novel patented mixture of polypropylene which provides exceptional transparency and dimensional stability. Its unique in its class design guarantees better fluid flow, minimizing turbulences and stress within the fluids during the filling and dosification processes. Available in different volume sizes (3 cc, 5 cc and 10 cc) and in both clear and dark-amber formats, blocking the latter light radiation from the UV to 550 nm. Suitable for sterilization by autoclave and ethylene oxide gas.



ORDERING INFORMATION:

3 cc transparent polypropylene syringe, piston included* (50 U)	RGMF001
5 cc transparent polypropylene syringe, piston included* (50 U)	RGMF002
10 cc transparent polypropylene syringe, piston included* (50 U)	RGMF003
3 cc amber-colored polypropylene syringe, piston included* (50 U)	RGMF004
5 cc amber-colored polypropylene syringe 5 cc, piston included* (50 U)	RGMF005
10 cc amber-colored polypropylene syringe, piston included* (50 U)	RGMF006

**Includes general-purpose HDPE white pistons*

Pistons, caps and connectors

PRODUCT OVERVIEW:
Syringe barrel pistons are specially suited for REGEMAT 3D compatible syringe barrels. End caps and tip caps ensure airtight sealing of the syringe barrels allowing to pre-fill syringe barrels or seal syringes between different uses. Connectors allow efficient transfer of fluids from syringe to syringe.

CHARACTERISTICS:
Syringe barrel pistons are manufactured by precision-molding of high-density polyethylene, ensuring a perfect fit with the constant internal diameter walls of REGEMAT 3D compatible syringe barrels. These features allow for accurate and consistent fluid deposits. Available in different volume sizes (3 cc, 5 cc and 10 cc). Suitable for sterilization by ethylene oxide gas and high-energy gamma radiation.

End caps feature a precision fit whilst tip cap design prevents the introduction of air within the barrel during installation. Both manufactured in low-density polyethylene, compatible with sterilization by ethylene oxide gas and high-energy gamma radiation. Connectors feature a luer-lock in both ends, and are provided in individually-sealed sterile pouches.

ORDERING INFORMATION:

Red polyethylene adjustment piston 3 cc (50 U)	RGMF007
Red polyethylene adjustment piston 5 cc (50 U)	RGMF008
Red polyethylene adjustment piston 10 cc (50 U)	RGMF009
Twist-on tip caps, universal (50 U)	RGMF010
Snap-on end caps for 3 cc syringes (50 U)	RGMF011
Snap-on end caps for 5 cc syringes (50 U)	RGMF012
Snap-on end caps for 10 cc syringes (50 U)	RGMF013
Luer Lock Connector (1 U)	RGMF014

Dispensing tips

PRODUCT OVERVIEW:

Dispensing tips specially suited for REGEMAT 3D compatible syringe barrels. Both conical polypropylene and straight stainless steel dispensing tips follow the highest standards of industry quality to guarantee accurate and repeatable 3D bioprinting.

CHARACTERISTICS:

The conical design of the dispensing tips manufactured in polypropylene allows for uninterrupted flow of viscous fluids whilst resisting obstructions when printing complex particulate materials.

The straight design of the tips manufactured in polished passivated stainless steel ensure consistent fluid deposits, making them ideal for general purpose bioprinting. Both kinds of dispensing tips are manufactured with clear and unsharpened ends to ensure a continuous flow and consistent fluid depositions.

Compatible with sterilization by autoclave (polypropylene tips only), ethylene oxide gas, and high energy gamma radiation.

ORDERING INFORMATION:

0.58 mm ID polypropylene dispensing tips (50 U)	RGMF015
0.41 mm ID polypropylene dispensing tips (50 U)	RGMF016
0.25 mm ID polypropylene dispensing tips (50 U)	RGMF017
0.15 mm stainless steel dispensing tips (50 U)	RGMF018
0.25 mm stainless steel dispensing tips (50 U)	RGMF019

Two-component syringe

PRODUCT OVERVIEW:
Bi-component syringes grant the possibility of mixing two different kinds of materials upon extrusion, facilitating the controlled deposition of a number of biomaterial mixtures according to the researchers needs.

CHARACTERISTICS:
Bi-component syringes are an ideal delivery system for the controlled mixing and deposition of biomaterials and bioinks made up from two different components. Available in 4 cc size (2 cc + 2 cc) for a 1:1 mixing ratio. Contains anti-crossover ports that ensure no contamination from barrel to barrel.

Mixer tip with static mixer composed of 8 mixing elements, and internal diameter of 2 mm. Tip caps available for convenient storage and re-use of unfinished products.

Manufactured in polypropylene and high-density polyethylene. Compatible with sterilization by ethylene oxide gas and high-energy gamma radiation.

ORDERING INFORMATION:

Bi-component syringeg	RGMF020

About Us

REGEMAT 3D is a biotech company pioneering since 2015 on the design and development of 3D bioprinting systems and bioreactors to create living tissues for regenerative medicine.

Our experience in custom made medical devices with our sister company BRECA Health care leads us to provide a big support to researchers in the clinical application. We work closely with the research groups during all the stages, our group of engineers and biologists support you within your application and support you bringin results from lab to bedside.

We work with many research teams that develop biomaterials helping to develop the systems for your printing process. In addition, we include their biomaterials in our catalogue and offer them to our community.

Collaborating with us means working with highly qualified engineers, experienced biologists, direct access to the clinical application and proximity to the biggest Spanish hospitals.

We are currently collaborating with different institutions in more than 30 countries. Each REGEMAT 3D bioprinting system is fully adapted to the requirements of each scientific investigation: head configuration, syringe quantity, temperature control.

"Our goal is not only to provide biomaterials, bioreactors, bioprinters and its consumables, but helping researchers worldwide to get new results"

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