



**Stability for long lasting support**

## **ABOUT XPECT INX®**

XPECT INX® develops and commercializes industry-leading biomaterials for 3D-bioprinting applications. With more than 20 years of experience in bio-ink development, XPECT INX® develops and offers a wide range of ready to use bioinks for different 3D-printing technologies, including 2PP, DLP and deposition-based 3D-printing.

By developing and supplying exceptional quality bioinks and biomaterials, we support our customers in bringing their tissue engineering and regenerative medicine applications to clinical reality. Our bioink products can be used in a broad range of biofabrication applications, including tissue, bone and organ regeneration, personalized drug screening, and organ-on-a-chip technologies.

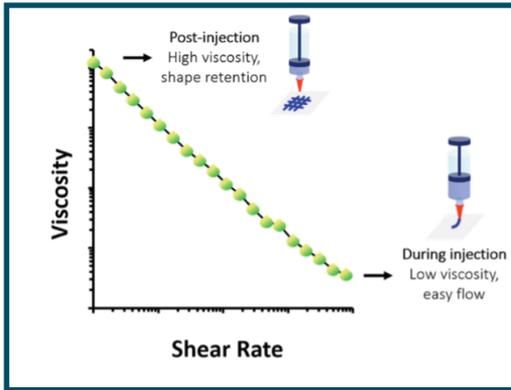
For more information on the company and our products, see [xpect-inx.com](http://xpect-inx.com).

## **X STABLE INX®**



X STABLE INX® is a synthetic, cell-interactive scaffold ink. It allows an easy printing process as a result of its shear thinning behavior, as illustrated in Figure 1. At high shear rates, it exhibits a low viscosity which is favorable for an easy injection from the printing nozzle. However, at low shear rates it reveals a high viscosity, which is required for shape retention after deposition.

Provided in a ready to print cartridge, X STABLE INX® is cell interactive and non-biodegradable. Photo-crosslinking produces a flexible yet strong hydrogel. Therefore, it can provide long lasting and durable support to a variety of cells and cellular structures.

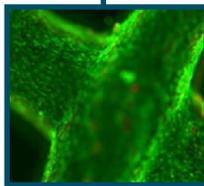
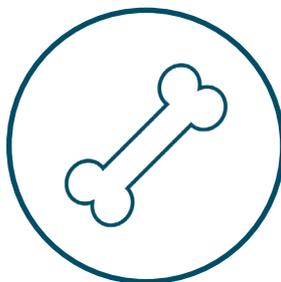


**Figure 1:** Typical flow curve for a shear thinning fluid: A decreasing viscosity profile as a function of shear rate indicates a shear-thinning behavior.

## X BIOLOGICAL APPLICATIONS

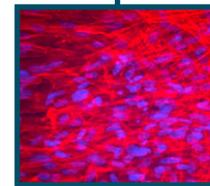
X STABLE INX<sup>®</sup> has been used to generate and sustain 3D cellular structures of a variety of human tissues, including bone tissue and human foreskin fibroblasts (nHDF). For more information on the biological applications of X STABLE INX<sup>®</sup> and the parameters used to generate these 3D cellular structures, contact us on [info@xpect-inx.com](mailto:info@xpect-inx.com).

### Bone tissue



### Osteoblasts

### Skin



### nHDF

## X BENEFITS OF X STABLE INX<sup>®</sup>

- Biocompatibility:** Exceptional biocompatibility and support for cell adhesion and proliferation.
- Reproducibility:** Production under strict quality control to provide a material that delivers every time.
- Biostable:** Suitable for long term applications.
- Processability:** The shear thinning behavior enables easy printing at a broad temperature range.
- Easy to handle:** Delivered in a ready-to-print cartridge.
- UV-crosslinkable:** CURASOL<sup>®</sup> technology enables rapid UV crosslinking, producing robust scaffolds.
- Mechanical integrity:** Very robust hydrogel which enables load bearing applications, and easy manipulation of printed constructs.

## X X STABLE INX<sup>®</sup> PROPERTIES & PROCESSING

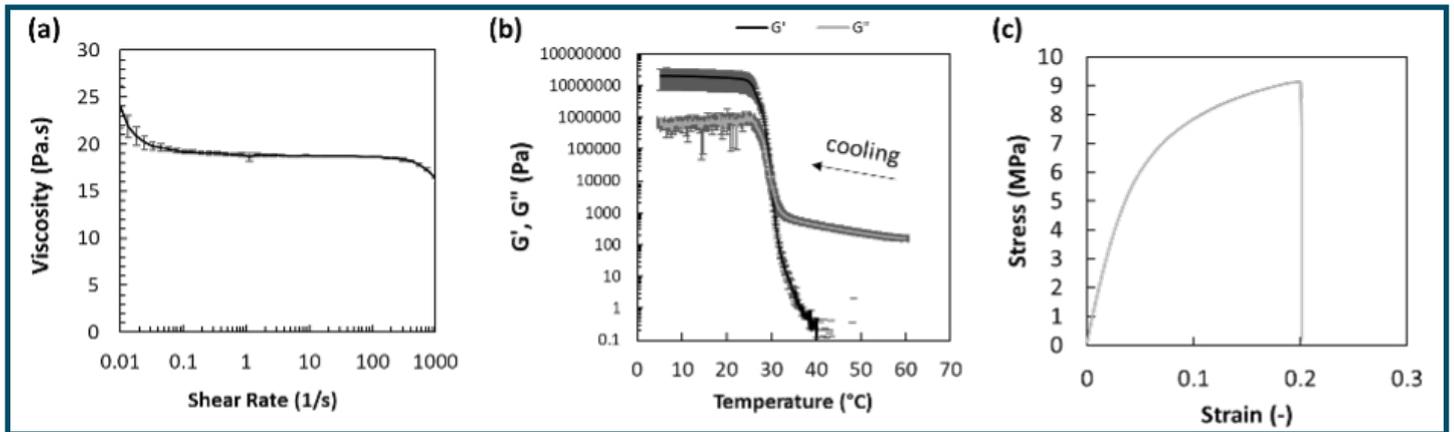
Physical Properties	X SOLID INX <sup>®</sup> Characteristics
pH	7.5 – 9.5
Viscosity ( $\dot{\gamma} = 0.01 \text{ s}^{-1}$ )	3500 Pa.s
Viscosity ( $\dot{\gamma} = 554 \text{ s}^{-1}$ )	1.56 Pa.s
Storage modulus	150 KPa

**Table 1:** Physical properties of X STABLE INX<sup>®</sup>.

X STABLE INX<sup>®</sup> is a transparent gel at room temperature. The physical characteristics of the product are listed in Table 1.

X STABLE INX<sup>®</sup> reveals a shear-thinning behavior as shown in Figure 2 (a). This is favorable for extrusion-based 3D printers as the printing ink is easily injected through the printing nozzle, and the post-injection flow is minimized in order to prevent structural deformation.

To enable an optimal printing process ensuring shape fidelity, an ink should not only exhibit shear-dependent viscosity, but its viscosity must also exhibit a rapid decrease and rapid recovery upon a change in the shear conditions. After ejecting from the printing needle, an ink solution should quickly regain its viscosity upon deposition onto the printing surface. The rate of viscosity recovery for X STABLE INX<sup>®</sup> was studied via rotational step shear tests at shear rates of  $0.1 \text{ s}^{-1}$ ,  $100 \text{ s}^{-1}$  and  $0.1 \text{ s}^{-1}$  in the sequential order. As shown in Figure 2 (b), X STABLE INX<sup>®</sup> exhibits a rapid viscosity recovery, regaining more than 85% of its viscosity after deposition.



**Figure 2:** (a) Flow curve of X STABLE INX<sup>®</sup> as a function of shear rate, (b) viscosity of X STABLE INX<sup>®</sup> tested in transient shear rate conditions and (c) storage and loss moduli of X STABLE INX<sup>®</sup> recorded via a rheometer during UV irradiation.

X STABLE INX<sup>®</sup> is photo-crosslinkable, and therefore the structures can be illuminated with UV irradiation during or after printing process. Prior to UV irradiation, the ink exhibits a storage modulus higher than its loss modulus, which is characteristic for physical gels (Figure 2 (c)). After irradiation with UV light, the ink reveals a rapid crosslinking process as indicated by the steep increase of storage modulus. Once crosslinking is complete, the ink reaches a storage modulus of approximately 150 kPa.

## PRINTER COMPATIBILITY

Our bioinks have been used repeatedly and successfully with the following printers:

-  Regemat 3D
-  FelixBio
-  Cellink BIO X



The R100 range is optimized for the Regemat 3D printer, the F100 range is optimized for the FelixBio printer and the X100 is the generic range which works on many printers, including the Cellink BIO X. If you would like to discuss your printer's compatibility with our bioinks, please contact us at [info@xpect-inx.com](mailto:info@xpect-inx.com).

## PRODUCT SUPPORT & PRICING

To discuss your product needs and pricing, email us at [info@xpect-inx.com](mailto:info@xpect-inx.com) or use the contact form at [xpect-inx.com/contact-2](https://xpect-inx.com/contact-2)