

User Protocol for Ultra-high temperature Ceramic (B4C) Ink for Direct-Ink Writing

Catalog No. [921912](#)

Chemicals Needed:

- 3D Printable Ultra-High Temperature Boron Carbide Ink (product **921912**)
- De-Ionized water

Equipment/Consumables Needed:

- Mixer container
- Plastic Spatula
- Balance
- Planetary Mixer
- Syringe (with caps)
- Syringe Nozzle
- Syringe plunger
- Direct-Ink Write (DIW) Printer
- Glass slides
- Oven and Furnace for drying and sintering

Step by Step Procedure for Ink Mixing and Loading into Syringe:

- (1) Place mixer container on balance and tare weight.
- (2) Using the spatula, scoop out desired amount of B4C ink (product 921912) from container into the mixer container on the balance. (For reference, for filling a 30-cc syringe, 46 grams of the B4C ink is sufficient.)
Note. Due to high solids loading, it is possible that the ink is too viscous to scoop out due to evaporation of solvent.
In that case, add 1-2wt.% of de-ionized water to the mass of ink taken in the container and subject it to thick mixing.
Adding more than 2wt.% of de-ionized water lowers viscosity greatly to an extent that it cannot be printed.
- (3) Using a planetary mixer, mix the ink using the following mixing sequence:
 - a. Mix setting @ 2000 rpm for 2 min.
 - b. Defoam setting @ 2200 rpm for 1 min.Repeat this mixing sequence twice. With hand mixing in between.
Note. Mix until a smooth paste is obtained.
- (4) Once thoroughly mixed, the ink can be loaded into a capped syringe for DIW Printing. Using the spatula, scoop the ink from the container and deposit on the side of the syringe.

- ### Other Notes for DIW:

- ## Post Processing of DIW printed parts:

-

Copyright © 2021 Merck KGaA, Darmstadt, Germany and/or its affiliates. All rights reserved. MilliporeSigma, the vibrant M, Sigma-Aldrich, and TissueFab are trademarks of Merck KGaA, Darmstadt, Germany or its affiliates. All other trademarks are the property of their respective owners. Detailed information on trademarks is available via publicly accessible resources. More information on our branded products and services on [MilliporeSigma.com](https://www.milliporesigma.com).

Millipore
SIGMA