



Supporting Information

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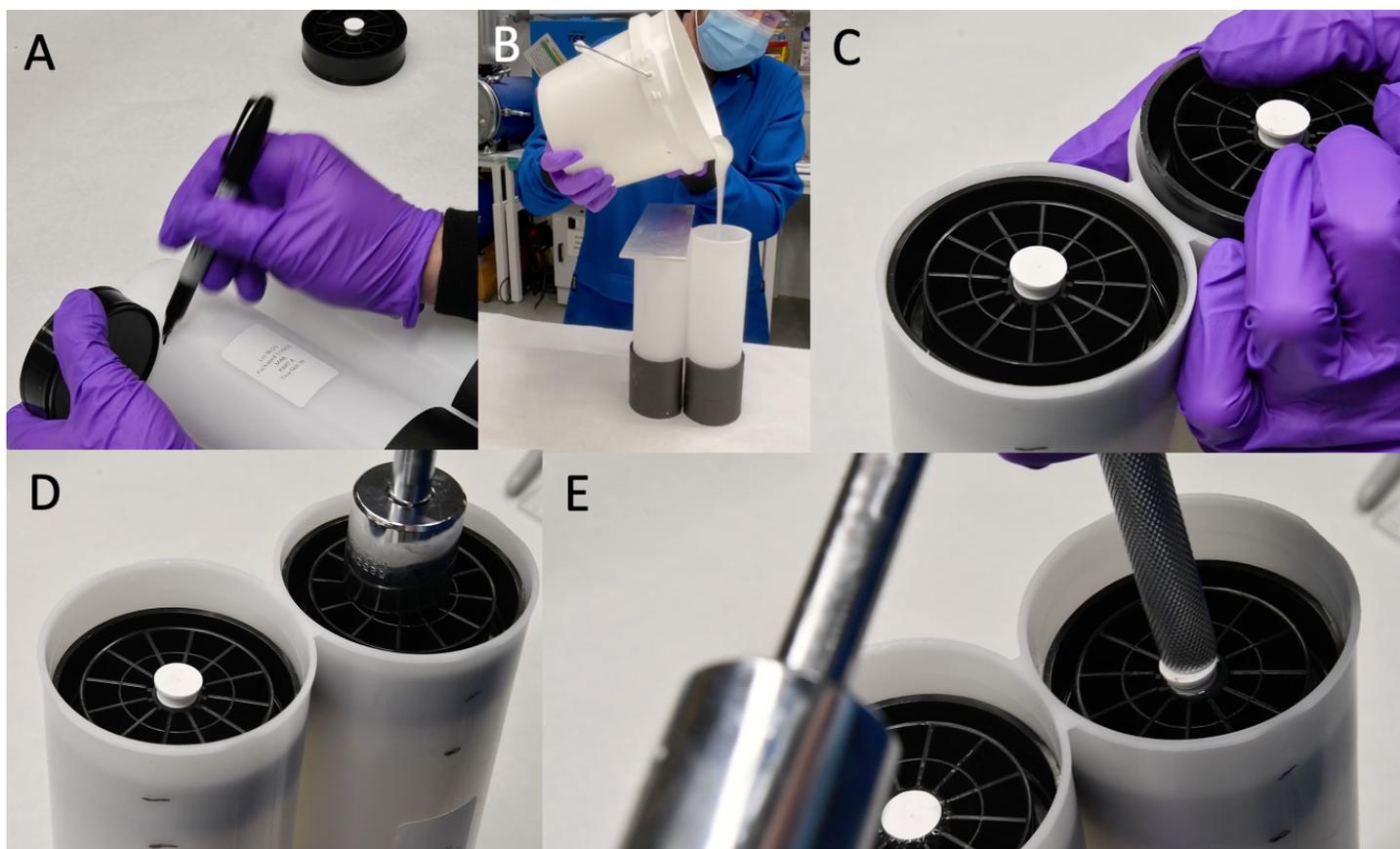
Injection Molding of Soft Robots

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Supplemental: Injection Molding of Soft Robots

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S1 Cartridge Filling



Supplementary Figure S1: Steps to fill an empty two-part, 1500 ml cartridge with True Skin 30 shown. A) Make a mark below the top of the cartridge at a distance twice the thickness of the plunger, which will be the fill line, on both sides. B) After stirring silicone, pour into each side while covering the other side to prevent contamination and degas until no bubbles are observed. C) Insert the vented pistons into each side. D) Using a socket large enough to clear the white vent plug, push down the black part of the piston until contact with silicone is made, allowing a small amount of silicone to flow around the white cap, F) firmly push the white vent plug down until it clicks, sealing the piston, on both sides.

Figure S1 details the steps to manually fill the cartridges. First, an empty cartridge is marked with the fill level by measuring a distance equal to twice the piston thickness on both A and B sides as seen in Figure S1A. Then the cartridge is placed upright, using custom made 3D printed cartridge holders ([files available on github¹](https://github.com/vaiomike/Nordson-EFD-Cartridge-Holder)), and one of the sides is covered to protect from contamination during pouring. Both parts of silicone are thoroughly stirred in their original containers to mix any settled materials. Each part is then poured into the open side of the cartridge, and repeated for the second side, while covering the first side for protection seen in Figure S1B. The cartridge is then placed in a vacuum chamber and fully degassed, until no bubbles are observed. This can take anywhere from 30 minutes to overnight, depending on the material. Direct supervision is necessary in the beginning of the degassing process and it may be necessary to ramp the vacuum pressure to prevent material from overflowing. Degassing low viscosity materials may take several minutes, while higher viscosity materials can take hours or be left overnight.

The cartridge can be removed once no bubbles are observed, and two vented pistons can be inserted as seen in Figure S1D. Vented pistons are preferred because they can easily release small amounts of trapped air during insertion, unlike standard pistons which require a shim to release air, resulting in significant challenges to remove

¹Nordson EFD Cartridge Holder, <https://github.com/vaiomike/Nordson-EFD-Cartridge-Holder>

all excess air. The vented pistons are pushed down using a socket large enough to clear the white vent plug, only contacting the black part of the piston as seen in Figure S1E. Once the piston hits the silicone material, a small amount of material is allowed to escape around the white vent plug ensuring there is no air left. The white vent plug is then firmly pushed into place until a snap is felt, and is flush with the black piston as seen in Figure S1F.