**Supplementary Material**

**Table S1. Parameters of Printers**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Hyrel | Intamsys | Indmatec |
| Nozzle diameter (mm) | 0.4 | 0.4 | 0.4 |
| Layer thickness (mm) | 0.2 | 0.2 | 0.1 |
| Fill density (%) | 100 | 100 | 100 |
| Print speed (mm/s) | 20 | 20 | 20 |
| Raster angle (°) | +/-45 | +/-45 | +/-45 |
| Nozzle temperature (°C) | 400 | 400 | 400 |
| Build plate temperature (°C) | 100 | 100 | 100 |
| Chamber temperature (°C) | Ambient temp | 145 | Ambient temp |

Table S2. X-, Y-, and Z- axis measurements of printed samples. Mean values and standard deviations are presented with % to the designed dimension.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Designed dimensions (mm) | Average of 3D printed measurements divided by the designed dimension x 100, with % deviation |
|  | Hyrel | Intamsys | Indmatec |
| Tensile specimen | Overall length |  | 57.5 | 98.2±0.11 | 98.8±0.16 | 99.2±0.15 |
| Width at ends |  | 9.5 | 98.3±0.02 | 98.9±0.05 | 101.4±0.11 |
| Thickness |  | 2.0 | 95.0±0.02 | 93.0±0.05 | 102.0±0.04 |
| Width at narrow portion |  | 3.0 | 103.3±0.05 | 105.3±0.04 | 123.3±0.13 |
| Compressive specimen | Diameter |  | 15.0 | 96.3±0.10 | 96.7±0.06 | 99.7±0.06 |
| Height |  | 15.0 | 97.1±0.03 | 97.5±0.04 | 101.1±0.04 |
| Flexural specimen | LengthWidth |  | 80.0 | 98.8±0.10 | 98.9±0.05 | 99.4±0.05 |
|  | 10.0 | 98.9±0.03 | 99.6±0.05 | 102.2±0.05 |
| Thickness |  | 4.0 | 99.3±0.03 | 98.5±0.04 | 103.3±0.04 |

Table S3. Results of mechanical and physical properties of printed PPEK

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Hyrel | Intamsys | Indmatec | Percentage of standard deviation of tested samples in each group  |
| Hyrel | Intamsys | Indmatec |
| Hardness (HD) | 84 | 86 | 82 | 2.5 | 4.4 | 3.1 |
| Tensile strength (MPa) | 65 | 76 | 84 | 4.7 | 3.3 | 5.9 |
| Tensile modulus (MPa) | 3065 | 3170 | 3337 | 10.0 | 7.6 | 11.0 |
| Tensile elongation (%) | 21.2 | 12.3 | 20.1 | 1.7 | 4.7 | 4.1 |
| Compressive strength (MPa) | 110 | 117 | 125 | 2.1 | 2.8 | 1.7 |
| Flexural strength (MPa) | 106 | 126 | 127 | 2.6 | 3.2 | 1.9 |
| Flexural Modulus (MPa) | 2190 | 2622 | 2667 | 7.5 | 3.8 | 4.7 |

Table S4. Summary of crystallinity of tensile samples.

