CLAIMS

We Claim:

1. A mold assembly for use in manufacturing parts, the mold assembly comprising:

a first mold half and a second mold half, the first mold half being formed from a first multiple layers of a polymer and the second mold half being formed from a second multiple layers of a polymer, the first mold half comprising at least a first mold cavity and a first coolant passage, the first coolant passage including a first surface, and the second mold half comprising at least a second mold cavity and a second coolant passage, the second coolant passage including a second surface;

a sealant coating the first and second surfaces of the coolant passages and extending between the multiple layers from the first and second surfaces of the coolant passages;

a mold temperature control system, the mold temperature control system in fluid communication with the first and second coolant passages of the first and second mold half, and

wherein the mold temperature control system comprises a fluid, a means to control the temperature of the fluid, and a pump to circulate the fluid through the mold temperature control system and the first and second coolant passages.

2. The mold assembly of claim 1 further comprising a sealant infused and cured on a first surface of the first mold cavity and on a second surface of the second mold cavity.

3. The mold assembly of claim 1 wherein the first and second coolant passages each comprises a first cross-section and a second cross-section, and wherein the first cross-section has a different dimension and shape as the second cross-section.

4. The mold assembly of claim 1 wherein the sealant comprises one of a two-part, high temperature epoxy and a flowable ceramic.

5. The mold assembly of claim 2 wherein the first surface of the first mold cavity and the second surface of the second mold cavity comprises a deposited metal.

6. A method of manufacturing a mold assembly, the method comprising:

creating a first computer aided design (CAD) model of a surface of a mold assembly, and wherein the surface comprises a final shape of a molded product;

adding a feature to the first CAD model of the surface to create a second CAD model of the mold assembly;

converting the second CAD model to a printing path file for use by a three dimensional printer, and

using the printing path file to print a solid model of the second CAD model.

7. The method of claim 6 further comprises removing excess material from the solid model.

8. The method of claim 7 further comprises converting the second CAD model to a tool cutting path and machining the solid model.

9. The method of claim 8 further comprises infusing a machined surface of the solid model with a sealant.

10. The method of claim 9 wherein the feature of the first CAD model comprises at least one of a parting surface, a coolant passage, an ejection pin hole, a vent hole, and an injection passage.

11. The method of claim 10 wherein infusing the machined surface of the solid model with the sealant further comprises infusing the machined surface and the coolant passage with the sealant and pressurizing the coolant passage between about 60 PSI and 100 PSI for 30 seconds.

12. The method of claim 10 wherein infusing the machined surface of the solid model with the sealant further comprises infusing the machined surface and the coolant passage with the sealant comprising one of a high flow, high

temperature two-part epoxy and a flowable ceramic and pressurizing the coolant passage between about 60 PSI and 100 PSI for 30 seconds.

13. The method of claim 12 further comprising one of electroplating, polishing, and machining the surface of the mold assembly.

14. A method of manufacturing a mold assembly, the method comprising:

creating a first computer aided design (CAD) model of a surface of a mold assembly, and wherein the surface comprises a final shape of a molded product;

adding a feature to the first CAD model of the surface to create a second CAD model of the mold assembly, and wherein the feature includes one of a parting surface, a coolant passage, an ejection pin hole, a vent hole, and an injection passage;

converting the second CAD model to a printing path file for use by a three dimensional printer, and

using the printing path file to print a solid model of the second CAD model.

15. The method of claim 14 further comprises removing excess material from the solid model.

16. The method of claim 15 further comprising converting the second CAD model to a tool cutting path and machining the solid model.

17. The method of claim 16 further comprises infusing a machined surface of the solid model with a sealant.

18. The method of claim 17 wherein infusing the machined surface of the solid model with the sealant further comprises infusing the machined surface and the coolant passage with the sealant comprising one of a high flow, high temperature two-part epoxy and a flowable ceramic and pressurizing the coolant passage between about 60 PSI and 100 PSI for 30 seconds.

19. The method of claim 18 further comprising one of electroplating, polishing, and machining the surface of the mold assembly.