## 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 coolant passage 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 coolant passage surface;

a sealant coating the first coolant passage surface and the second coolant passage surface of the coolant passages and extending between the multiple layers from the first coolant passage surface and the second coolant passage surface 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 wherein the sealant is infused and cured on a first mold cavity surface of the first mold cavity and on a second mold cavity 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 mold cavity surface of the first mold cavity and the second mold cavity surface of the second mold cavity comprises a deposited metal.