

Claims

1. A lighting system comprising
a light source, and
5 a cooling system with temperature sensing and responding capability coupled to the light source for maintaining a temperature of the light source within a defined variation from a set temperature.
2. The light system of claim 1, wherein the light source is a light emitting diode (LED) array.
3. The light system of claim 1 or claim 2, wherein a power rating of the light source is in the range of about 30 watt to about 80 watt.
4. The light system of any one of the preceding claims, further comprising a heat sink coupled
15 to the light source.
5. The light system of claim 4, further comprising a thermally conductive adhesive which fills a gap between the light source and the heat sink.
6. The light system of any one of the preceding claims, wherein the cooling system comprises:
a temperature sensor;
a controlling board configured to generate a command signal responsive to the
temperature sensor; and
25 a cooling means configured to cool the light source in response to the command signal.
7. The light system of claim 6, wherein the temperature sensor is coupled to the light source.
8. The light system of claim 6, wherein the light source and the temperature sensor are disposed on the heat sink and the temperature sensor detects the temperature of the heat sink.
9. The light system of any one of claims 6 to 8, wherein the cooling means is an electronic fan.
10. A method of adjusting a temperature of a light source comprising the steps of
a) sensing the temperature of the light source, and
35 b) adjusting the operation of a cooling means of a cooling system with temperature sensing and responding capability coupled to the light source in response to a temperature change of the light source, whereby the temperature change is a temperature difference between the temperature sensed in step (a) and a set temperature of the light source.
11. The method of claim 10, wherein the set temperature is in the range of about 20°C to about 40°C.
12. The method of claim 10 or 11, wherein step b) comprises the step of b1) operating the cooling means at a default cooling rate when the light source is turned on.
13. The method of claim 12, wherein step b) further comprises the step of b2) increasing the operation of the cooling means by a defined percentage for each degree Celsius temperature increase of the light source above the set temperature.

14. The method of claim 13, wherein the defined percentage is in the range of about 5% to about 30%.

5 15. The method of claim 13 or 14, wherein step b) further comprises the step of operating the cooling means at the default cooling rate or stopping the cooling means if the temperature of the light source is lower than the set temperature.

10 16. The method of any one of claims 12 to 15, wherein the default cooling rate is in the range about 50 rpm to about 200 rpm.

17. A method of assembling the lighting system of any one of claims 1 to 9, comprising the steps of

15 a) attaching a light source to a heat sink with a thermally conductive adhesive, and
b) coupling a cooling system with temperature sensing and responding capability to the light source, the heat sink, or the thermally conductive adhesive.

18. The method of claim 17, wherein the cooling system is coupled to the light source, the heat sink, or the thermally conductive adhesive via a temperature sensor.

20 19. The method of claim 18, wherein the temperature sensor is further coupled to a controlling board and the controlling board is coupled to a cooling means responsive to a command signal generated by the controlling board.

25 20. An additive manufacturing system for three-dimensional printing comprising the lighting system of any one of claims 1 to 9.