CASE STUDY

CUSTOMER:
Morpheus Lights

INDUSTRY:
Entertainment Lighting

PROJECT NAME:
Thermal Design and Analysis of the PanaBeam™XR2 Lamp

CUSTOMER LOCATION:
Redding, California

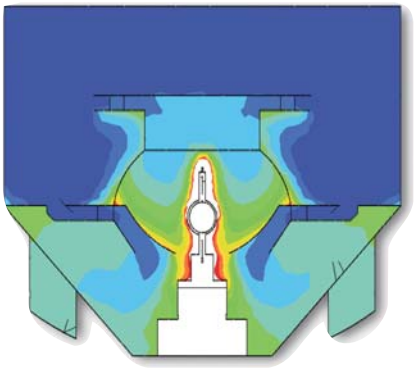
OVERVIEW

The PanaBeam™XR2 is a 1,200W high performance automated washlight from Morpheus Lights for professional users in the entertainment industry. It features a combination of beam modification and motion control capabilities using a high-performance drive system. Morpheus Lights contracted ATA Engineering Inc. (ATA) to perform thermal design and analysis of this very high powered system.

In five weeks, ATA performed more than thirty full-scale calculation runs, covering a large spectrum of design iterations. ATA provided Morpheus Lights with a successful design and recommendations for further performance improvements. These recommendations provided cost-effective options should thermal design specifications be revised in the future. The final design achieved minimal noise, low manufacturing cost, and met all thermal requirements even under adverse environmental conditions.

ATA SUPPORT INCLUDED:

- Thermal analysis including simultaneous treatment of all modes of heat transfer:
  - Conduction through lamp components;
  - Forced air convection on internal structure;
  - Natural convection on exterior surfaces;
  - Diffuse thermal radiation exchanges;
  - Wavelength-sensitive specular distribution of radiation via ray tracing on reflective surfaces.
- Developed a model of the bulb and correlated it to test results.
- Performed detailed flow analysis throughout the structure and determined thermal stresses on high-temperature components.
- Assisted Morpheus Lights with manufacturing considerations.
- Compiled comprehensive analysis results for both typical and worst-case operating conditions.



Internal air flow thermal contours predicted using detailed coupled fluid/thermal analysis

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