



Project Name: Tracheal Tube with Simulated Germicidal Light
Application: Design and build a functional prototype device
Customer: Rife Endotracheal Tube

GERMICIDAL LIGHT TO REDUCE THE RISK OF PNEUMONIA ASSOCIATED WITH ENDO-TRACHEAL AND TRACHEOSTOMY TUBES

BACKGROUND

Endotracheal and Tracheostomy tubes are used to provide an airway in patients who do not have an adequate airway due to medical conditions. Both tubes incorporate an inflatable cuff to secure the tube and prevent aspiration of oral secretions and other contaminants in to the lungs. A consequence of the inflated cuff is that undesired bacteria may colonize around the top of the cuff. Aspiration of these bacteria is a leading cause of ventilator-associated pneumonia.

The Rife Endotracheal Tube incorporates a germicidal light adjacent to the cuff; activation of the germicidal light source causes a radiation emission that kills the undesired bacteria and may reduce the need for administration of antibiotics.

PROJECT AND CHALLENGES

PADT Medical was chosen to design and produce the first functional prototype of the Endotracheal Tube incorporating the germicidal lighting features. The prototype was designed, hand crafted, tested and demonstrated by PADT Medical Device Engineers.

The focus of this project was to provide a low cost, quick-turnaround, proof-of-concept prototype. PADT engineers worked closely with the customer/inventor to produce a demonstration-ready prototype.

One challenge that the design team faced was to find a way to remove material from existing endotracheal tubes to accomodate the additon



In 2008 PADT developed the first functional prototype of the Rife Endotracheal Tube with Germicidal Lights

DISCIPLINES EMPLOYED

Material Science

Mechanical engineering and industrial design

Verification testing

Electromechanical System Integration

Rapid Prototyping

Functional Prototyping of Medical Devices

PADT

7755 S. Research Drive
Suite 110
Tempe, AZ 85284

www.padtinc.com

info@padtinc.com
Voice: 480-813-4884
Toll Free: 800-293-PADT

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of the lighting feature. The team was able to use the diverse experience, extensive vendor network, and test facilities to identify and solve this problem.

The design and development tasks started with the development of a light source, a power source, and the control circuitry. Once that was accomplished CAD models were constructed and prototypes were made. These were functionally tested to understand: balloon inflation and deflation, flexing behavior, endurance under cyclic loading, and testing of the lights and circuitry. Results from the testing were used to

The functional prototype was delivered to the customer within 8 weeks along with detailed mechanical drawings..

TESTIMONIAL

The PADT experience was a positive one from my first phone conversation with them to the delivery of the end product. The engineers delivered a prototype that was exactly what I envisioned in a short 8 weeks. PADT will be my choice in the future."

Bob Rife, R.R.T.

PADT

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Suite 110
Tempe, AZ 85284

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Voice: 480-813-4884
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