Dale E. Polk is a 30 year veteran of the composite industry. His industrial experience includes Hercules Aerospace, Ciba-Geigy and Phillips Petroleum. He is the inventor of two novel thermoplastic processes, which are the basis for LRM International’s large composite part production capabilities. In 2007, he formed D&D Manufacturing to leverage these technologies in the production of large green commercial parabolic troughs, and dishes. Mr. Polk has undergraduate degrees in chemistry and physics, as well as advanced degrees in chemical engineering and applied mathematics.

Abstract

A presentation concerning new composite processing technologies which allow for the affordable production of large thermoplastic composite structures. This includes solar parabolic troughs, used for heating commercial sized pools, and other water heating related applications. Also included will be a short summary of other large composite products such as plastic decking, beams, and staircases, represented in light of their low cost, and greatly reduced maintenance.
Large Composite Technology Makes Parabolic Solar Water Heating a “Green” Reality

Dale E. Polk

Two New Patented Processes

• TPF (Thermoplastic FlowForming)
  – Computer-controlled extrusion compression process
• STF (Sheetless ThermoForming)
  – Process eliminates two traditional steps in thermoforming

Three Broad Groups of Solar Collectors

• Plastic Tube Type Collectors
  – Used for heating pools
• Metal Tube Type Collectors
  – Used for residential hot water
• Concentrated Solar Collectors
  (Parabolic Trough and Flat Mirror Type Collectors)
  – Used for electrical power generation
Solar Collector Issues Today

- Flat panels
  - Current state of the art fairly low efficiency
- Parabolic troughs
  - High cost
    - Mirrors
    - Stainless steel
    - Copper
  - Weight
  - Aesthetically unappealing

What Makes SPTechnology Different

- New Patented Plastic Processes
  - TPF (Thermoplastic FlowForming) compression extrusion technology
  - STF (Sheetless ThermoForming Technology) allows for the production of very large thermoplastic composite structures
  - Production of precise structural parts
- Two New Patent Pending Designs
  - Composite Parabolic Trough
  - Collector

Patent Pending Trough Features

- Static design
  - Maximizes solar collection
  - 70% efficiency
  - Roughly 240 BTU/sq ft/hour or 300,000 BTUs per trough per day
- Easy to install or retrofit (3 people)
  - 24 ft. by 102''
  - Lightweight - 2 sections, 200 lbs. each
- No moving parts
- Low maintenance
- Shipping by container or truck
- Seasonal rotations (4 times per year)
Patent Pending Collector

Features

• Designed to maximize solar energy collection
• Polymer clear plastic tube (no glass)
  – High resistance to damage
• Minimum pressure drop
• No heat exchangers
• Expandable bladder
  – Can be used in freezing climates

Commercial Solar Parabolic

Technology Benefits

• Great Economics
  – Thermoplastic composite structure
  – Mirrored film
    • Metalized PET film with a polyethylene protective coating
  – Low cost per square foot of solar collection area
  – 70% efficiency
• Extremely Green
  – No Volatile Organic Compounds (VOC’s)
  – Low energy usage for production and shipping
  – Uses recycled resins (PET)
  – 0% waste stream

Parabolic Trough
Solar Troughs on Rooftop

Innovative Collector Design Prevents Possible Freezing Damage to System

Solar Spire
- Great efficiency
- Easy to install
- Lightweight
- Two sizes
  - 96” x 44”
  - 18” x 26”
New Composite Products for the Waterpark Industry

• Very low maintenance
• No corrosion, even in very hostile environments
• Easy to install
• Cost competitive

12 ft Composite Truss

2 ft x 4 ft Composite Walkway Panel
Staircase with Landing

Questions

Contact

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