

INCREASED ENERGY EFFICIENCY FOR RENEWABLE ENERGY APPLICATION

CASE STORY "DESIGNATED CHYP PROCESS AT PROTON POWER INC., LENOIR CITY, TENNESSEE, USA"

By converting biomass waste materials, a customer in the US produces hydrogen to convert to synthetic fuels, electricity and heat. A multizone muffle tube furnace is used to initiate and sustain the biomass pyrolysis.

THE CHALLENGE

The customer is Proton Power Inc., Lenoir City, Tennessee, USA, and the process is designated CHyP (Cellulose to Hydrogen Power). Proton Power had installed Fibrothal® RAC 150/500 elements in the process, but found it necessary to run the elements at the top limits of their design temperature, 1200°C (2200°F), and watt loading. This resulted in element lifetimes of only 2-4 months due to wire sagging and meltdowns. There were also deformation problems with the alloy steel tubes.



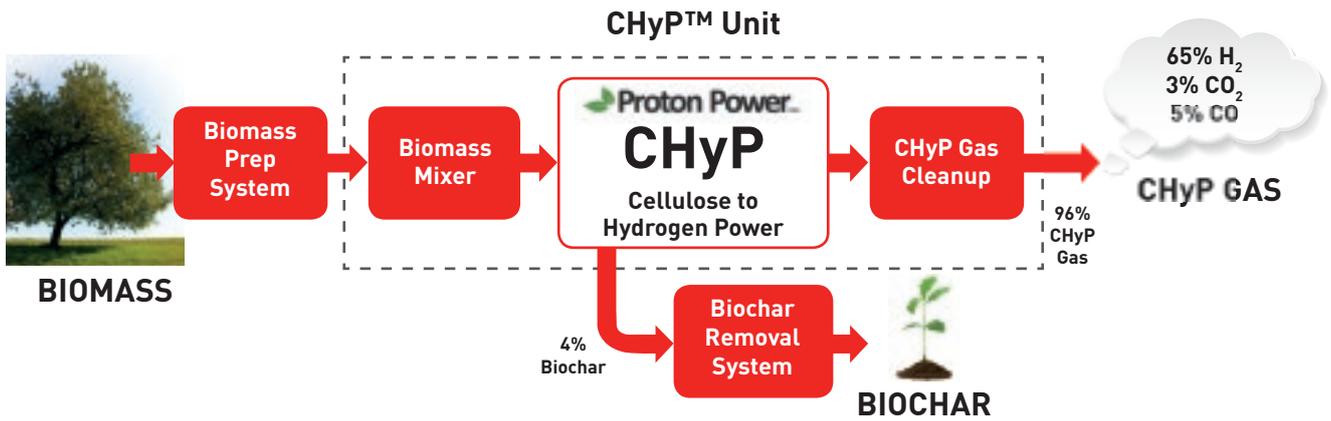
THE KANTHAL SOLUTION

The technical sales team suggested using the patented Aztec Helix Element technology that has a history of successful operation at higher temperature ranges. The customer tested multiple iterations of the CHyP Engine design and found that a smaller diameter and longer tube combination, with additional power in the entry zones, enhanced the cellulose pyrolysis and allowed increased feed levels. Supply voltages were therefore increased by 20%, with minimal design changes required to the Aztec Helix Elements.

SYSTEM CONFIGURATIONS

- 6-zone Aztec Helix Assembly with integral tube centering vestibules (5725 mm long).
- Elements approved to run on 20% increase over design parameters.
- Elements designed to be used in either a left-hand or right-hand configuration.
- Thermocouple blocking plates included to reduce heat loss from unused locations.
- The customer purchased two different levels of the MRL Energy Saving Elements (ESE II and ESE III) to test additional energy saving potential vs. standard insulation.





THE RESULT

The Aztec Elements increased element lifetime by a factor of 10 compared to the Fibrothal® RAC alternative, thus significantly reducing replacement costs and system downtime. The Aztec Elements have also allowed higher throughput with capacity for increased power input, flexible zoning options, and proven energy efficiency. Proton Power has now purchased multiple Aztec Helix Assemblies for CHyP Engine Systems being installed at several biodiesel refueling centers in the United States.

Visit kanthal.com/services to learn more about the details of this CHyP Engine application in addition to our full line of thermal solutions.



S-KA089-SS-ENG, 02.2017, Printed in Sweden