Introduction latest technology of twin shaft continuous reactor under high temperature / vacuum condition operation

Author: Tsutomu Ishimaru (Presenting Author will be decided later)

Affiliation: KURIMOTO, LTD. City: Osaka Country: Japan

Introduction of KURIMOTO, LTD.

KURIMOTO was established in 1909. We are a Japanese manufacturing company of industrial machines, and have supplied a lot of machines and contributed to the industrial growth worldwide. In this Achema 2018, we are pleased to introduce the latest technology for twin shaft horizontal type continuous reactor under high temperature / vacuum condition operation.

Hybrid Reactor

Hybrid Reactor was developed based on KRC Kneader which is twin screw horizontal continuous kneading processor and more than 2000 sets were supplied worldwide. And Hybrid Reactor is a low shear type reactor and focused on taking long residence time, good surface renewal property and plug flow performance. It is designed with emphasis on polymerization reaction requiring long reaction time and monomer removal, also it can be used for a finishing process for various high viscosity raw material products.

Seal design

Especially in the polymerization process, it is often required to operate under high temperature /high vacuum conditions, but designing and manufacturing a twin shaft horizontal continuous reactor that can realize these at a high level is not easy. Kurimoto's original integral structure allows operation at 350℃ and high vacuum (1 mbar). In addition, we have confirmed the sealing performance under high temperature/high vacuum conditions with our own seal evaluation equipment and developed countermeasure technology, so Hybrid Reactor can be responded to various needs of customer.

Blade design

There are several types of blades, and it also can be custom made according to customer's request. From long year manufacturing experiences of continuous kneader, blade configuration enables low shear mixing with excellent self-wiping property, it forms a large gas-liquid interface and surface renewal, and realizes excellent reaction accelerating effect.

Simulation

Currently collaborative research with the University of Tokyo is under proceeded. Recommendation of optimum design by simulation, such as selection of blade shape, will be possible in the future.

Large machinery

It is possible to produce a large-scale twin shaft horizontal continuous reactor up to 50,000 L and it is expected contributing to mass production and process improvement.