

Abstract

Structured packings are known for their excellent heat transfer properties in multi-tubular fixed-bed reactors. Previous research concluded that the open-cross flow structures (OCFS) and closed-cross flow structures (CCFS) have the best heat transfer performance compared to glass beads, foam and knitted wire.

The influence of the orientation on heat transfer properties of OCFS and CCFS packings in a single-tube fixed-bed reactor was studied. For both types of packings it was found that 90° alternating rotation of the packings is always better than 0° alternating rotation.

The influence of the fit on heat transfer properties of OCFS packings in a single-tube fixed-bed reactor was studied. It was concluded that the OCFS packings with a better heat transfer performance were the ones with a big gap between the edge of the packing and the reactor wall.

The heat transfer performance of the OCFS and CCFS packings are very similar. However, for high gas velocities the OCFS are clearly better than the CCFS packings.

It was concluded that the simplified 2-D pseudo-homogeneous plug flow model and the 2-D pseudo-homogeneous plug flow model are not good models to these types of packings.