Use of the Aspen Plate program to model a polymer plate heat exchanger

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This presentation shows how the Aspen Plate program can be successfully used to model a plate type heat exchanger constructed from polymeric material. The modelling work is part of a collaborative research program aimed at development of cost-effective heat exchangers for use with corrosive fluids.

The overall construction of the polymer exchanger and the formation of the alternate hot and cold passages are similar to a gasketed plate and frame heat exchanger. The flow passages themselves are, however, different from the normal cross-corrugated passages of a standard plate heat exchanger. In fact the special passages moulded into polymer plates were optimized for the heat transfer and pressure drop performance with the aid of numerical simulation. This does mean that the standard thermal-hydraulic performance modelling for cross-corrugated flow passages through the use of built-in heat transfer and pressure drop correlations in the Plate program is not applicable to this polymer heat exchanger. The facility of the user specified Colburn j and friction factors, provided in the Aspen Plate program, proved very useful to overcome this problem. Furthermore, the Plate program's other features such as the user specified plate thermal conductivity ensured that every aspect of the polymer plate heat exchanger, different from a typical plate heat exchanger, could be taken into account in the detailed modelling. Finally, demonstration of the Aspen Plate program will show the results of this detailed modelling of the polymer heat exchanger.