

# DISC TYPE COMPACT HEAT EXCHANGER

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## Partner institution : CONCORDIA UNIVERSITY



### BACKGROUND

Shell-Tube heat exchangers represent the largest product segment at 28% share. They are the oldest type of heat exchangers and the most tried and tested in the market.

Product improvement potential is small and focused mainly on reducing the effect of corrosion.

Shell-Tube heat exchangers have two main weaknesses: i) they are prone to fouling and expensive to clean, and ii) they are not highly efficient since they require a larger heat transfer exchange surface area and are thus more expensive.

For these reasons, Plate Heat Exchangers have the fastest growth. Their success is attributed to: i) lower initial costs, ii) lower costs for cleaning, iii) better heat transfer efficiency leading to smaller required heat transfer area, and iv) more compact physical package.

### TECHNOLOGY

A novel swirl flow heat exchanger which combines the efficiency of the plate heat exchanger and operating costs which are lower than a Shell-Tube exchanger. The new, innovative idea is based on the physics of swirl flow between disks, where the resulting centrifugal force mechanism performs the same action as increasing the tubes and passages in the traditional design, resulting in a significant improvement in heat transfer efficiency.

### COMPETITIVE ADVANTAGES

The novel heat exchangers will be several times smaller than standard shell-tube heat exchangers of the same capacity and require 2-3 times less pumping energy for moving the fluids.

When compared to Plate Heat Exchangers, the Swirl type heat exchanger requires 8-18 times less pumping energy for a slightly larger physical volume. It is also 20% more efficient in terms of heat transfer per unit area. In addition, the Swirl Type Heat Exchanger is simple in its design, less prone to fouling and is therefore an ideal replacement for both shell-tube and plate heat exchangers.

### TECHNOLOGY DEVELOPMENTAL STAGE

Four Beta prototypes of various sizes up to 84kW have been built and the experimental data is in agreement with the computer model which can now be used to do sizing.

### PATENT STATUS

Patent pending by Georges Vatisstas and Mohamed Fayed for Europe, Canada, USA, India and Hong Kong.

### BUSINESS OPPORTUNITY

Partnering or licensing to bring the technology to market.

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