

Valve plates

Executive Summary

Project Subject: A new valve plate for distillation columns

Entrepreneur: Dr. L. Pozin

Industry: Petrochemistry

Project Status: Pre-seed

Business Description: Distillation is one of the most important operations in petroleum refining. Mass transfer columns present about 15% of the total mass of refinery equipment, and about 50% of energy is spent by the mass transfer operations. Efficiency of the mass transfer equipment is a significant constituent in the total plant efficiency.

Technology Description: The proposed project's aim is to increase flow capacity of distillation column by increasing the active area of the plate up to 100% of its cross-section. This is achieved by application of a new design of valves which provide automatic downflow of liquid along with keeping a constant liquid level on the plate. The new design of the valve does not influence the range of stable flow regimes, it is very simple and easy for manufacturing and includes less details than usual valve plates with downflow devices.

The advantages of the new plate design are as follows:

- Increase of maximum flow capacity of distillation columns per unit of total cross-section by 5-15%
- Possibility of replacement of the usual plates in existing columns with new ones in order to increase production capacity of refining installations
- Reduced price of the new plates as compared to the existing plates with downflow devices
- Possibility of patenting.

Applications: The new plates can be used for replacement of existing ones in plate columns used in different refinery installations. One of the most obvious applications is improvement of atmospheric and vacuum distillation columns in crude oil treatment installations as a part of periodic revamping operations. The new plate can be used also in other columns for distillation, absorption and stripping processes.

Market Opportunity: The total number of the crude oil treatment installations is estimated at about 1000 units, and several thousands of columns are used in these installations. Taking into account that the revamping period of the crude treatment installations is usually not more than three years, the market capacity for this application only may be estimated at about 200-300 customers per year with 2-4 columns each.