Organic synthesis parallel products production development

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Pavlodar Chemical Plant's Storage maintains dioctylphthalate equipment department, the volume of which reaches 5.000 tons. It is usually used as a plastifier of plastic production. The process is periodical and based on the reaction of phthalic anhydride etherification by 2-ethylhexanol with catalytic agent followed by the neutralization of acid ether.

This production as differs from acid technology results in a smaller volume of drip water and is more economically favourable.

Basic kinds of raw material are phthalic anhydride, ethylhexanol and tetrabutyl titanate (catalytic agent)

The temperature of the process is 200 C with vacuum blowing (pressure: 50000 pascal).

The process of di-(2-)octyl) phthalate production runs in two stages:

a) the formation of mono-(2-octyl)- phthalate (monoester)
b) the formation of di-(2-octyl) phthalate (diester)

After the etherification process diester – raw contains exuberant alcohol, monoester and residual quantity of low-molecular auxiliary reaction products either.

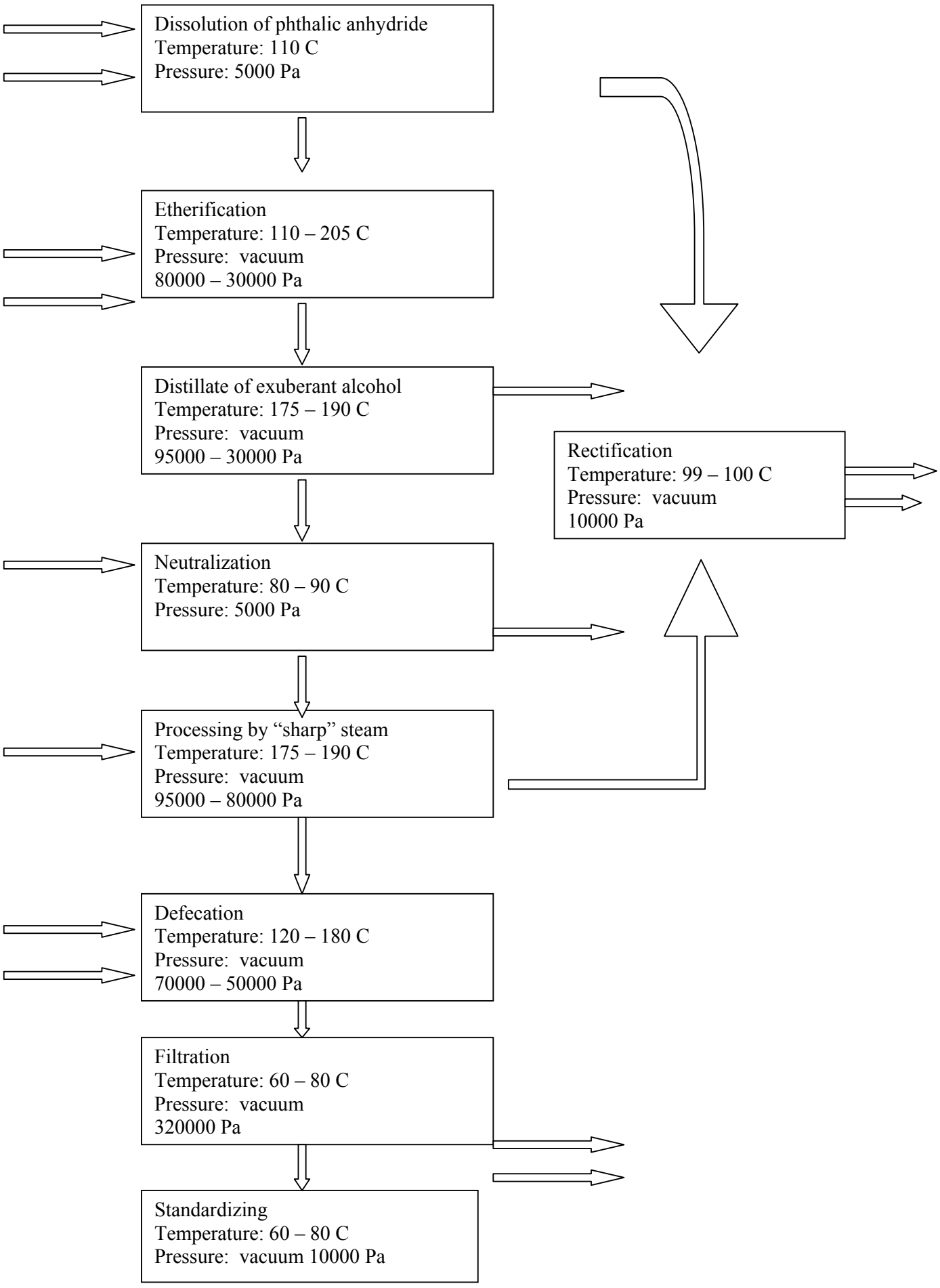
The technological process of dioctyl phthalate production includes several stages.

Basic stages:

- Preparation of raw material
- Dissolution of phthalic anhydride in 2-ethylhexoate
- Etherification
- Neutralization of di-(2-octyl) phthalate – raw.
- Processing of di-(2-)octyl) phthalate – raw by "sharp" steam, distillation of exuberant 2-ethylhexanol
- Defecation and drying of di-(2-)octyl) phthalate
- Filtration of the product done
- Standardizing of di-(2-)octyl) phthalate
- Detoxication of technological residual gasses
- Steam stripping of drip water

Supplementary stages:

- Vacuum systems of production
- Gathering of drip water and emergency drainage
- The system of gate feeder liquid feeding
- The system of azotic "breathe"


Dissolution of phthalic anhydride
Temperature: 110 C
Pressure: 5000 Pa
Etherification
Temperature: 110 – 205 C
Pressure: vacuum
80000 – 30000 Pa
Distillate of exuberant alcohol
Temperature: 175 – 190 C
Pressure: vacuum
95000 – 30000 Pa
Rectification
Temperature: 99 – 100 C
Pressure: vacuum
10000 Pa
Neutralization
Temperature: 80 – 90 C
Pressure: 5000 Pa
Processing by “sharp” steam
Temperature: 175 – 190 C
Pressure: vacuum
95000 – 80000 Pa
Defecation
Temperature: 120 – 180 C
Pressure: vacuum
70000 – 50000 Pa
Filtration
Temperature: 60 – 80 C
Pressure: vacuum
320000 Pa
Standardizing
Temperature: 60 – 80 C
Pressure: vacuum 10000 Pa

The set of equipment includes such unique items as chemical reactors made of special stainless steels and covered by acid-alkaline enamel (volume 14 – 16 m^3), containers made of titanium; rectificational columns made of chromonickeltitanium alloys and suchlike – all in all 78 items of unique equipment that are easy to readjust for production of a big number of original products. Schemes are completely computerized and don't require big personnel.

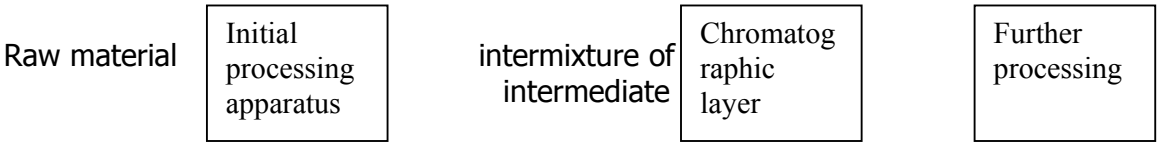
There's no need in such a big volume of di-(2-)octyl) phthalate (5.000 tons) in up-to-date Kazakhstan market conditions. But in next few years the developing production of plastic on the basis of oil-chemical complex will probably require from 500 – 1000 tons of di-(2-)octyl) phthalate and its derivates a year.

That's why proposed is the way of transfer of some equipment department aimed at production of some quantity of items with the similar raw nature. For example, the release of special pentaphtol enamels, turbine oils, haredeners and suchlike.

All the laboratory staff is additionally equipped with chromatographic dividing layers made of local deposit clays and modified clays either. This clays divide under control the intermixture of products processed in the devices on separate components directed then to corresponding devices for production of the final product in the latter.

That is, a well known method of industrial chromatography is used.

Modifying the conditions of processing and the conditions of dividing on clays, the productivity of each product can be changed in accordance with the local market requirements.



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