Summary

There is provided a continuous process for preparing acrolein, wherein the following steps are carried out

A) gas-phase oxidation of propene by means of air over a heterogeneous catalyst in the presence of a diluent gas in one reaction stage

B) capture of the acrolein-containing gas stream A) in a quenching stage consisting of bottom, middle and top sections for separating off by-products in the presence of water and an organic phase containing sparingly water-soluble organic solvent

C) capture of the acrolein-containing gas stream from the quenching stage B) in an absorption stage consisting of bottom, middle and top sections in the presence of water and an organic phase containing sparingly water-soluble organic solvent to obtain an aqueous acrolein solution which contains organic phase, and an incondensable gas stream

C1) at least partial recirculation of the incondensable gas stream from C) as diluent gas to the reaction stage A)

D) separation of the acrolein by distillation from the aqueous acrolein solution which contains organic phase from C) in a distillation stage

where the remaining aqueous solution which contains organic phase and has been freed of acrolein is discharged from the distillation stage D) so as to form an organic phase II which is separated from the associated aqueous fraction II (phase separation II), the organic phase II is introduced into the bottom section of the quenching stage B) from which the organic phase II is separated off together with an aqueous fraction via the top section by distillation and/or stripping so as to form an organic phase I which is separated from the associated aqueous fraction I (phase separation I) and introduced into the bottom section of the absorption stage C).