

Purification Of A Liquid Hydroformylation Product Stream

Summary

- 5 A process for the purification of a substantially liquid effluent containing aldehydes and unconverted olefins coming from a hydroformylation reactor following low-pressure hydroformylation of C_2 - C_{20} olefins or olefin mixtures containing different isomers of the respective olefins, said hydroformylation being catalyzed by means of a phosphorous rhodium catalyst homogeneously dissolved in the reaction
10 medium and carried out at a temperature of from 50° to 150°C and a pressure of from 2 to 30 bar, wherein
- 15 a. the hydroformylation product stream containing liquid and gaseous components and comprising, apart from the catalyst, essentially the hydroformylation product, by-products boiling at temperatures above the boiling point of the hydroformylation product, unconverted olefin, and saturated hydrocarbons and unconverted synthesis gas, is depressurized in a let-down vessel,
 - 20 b. during depressurization, the pressure and temperature are lowered to such a degree that there are formed a liquid phase containing essentially the catalyst, by-products boiling at temperatures higher than the boiling point of the hydroformylation product, and residual amounts of hydroformylation product and unconverted olefin, and a gas phase containing essentially the
25 hydroformylation product, unconverted olefin, saturated hydrocarbons, and unconverted synthesis gas,
 - c. a liquid stream is withdrawn from said liquid phase, and a gaseous stream is withdrawn from said gas phase,
 - 30 d. the liquid stream is then heated to a higher temperature than the temperature prevailing in the let-down vessel,
 - e. the heated liquid stream is passed in liquid form to the head region or the upper
35 part of a column,
 - f. the said gaseous stream withdrawn from the let-down vessel is passed to the bottom or lower part of said column and caused to flow countercurrently to the liquid stream introduced at the head or upper part of this column,
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 - g. a gaseous stream enriched in olefin and hydroformylation product is withdrawn at the head of the column and passed on for further purification,

- h. a liquid stream is withdrawn at the bottom of said column, which stream contains less hydroformylation product and olefin than present in the liquid stream fed to the head region or upper part of the column, and
- 5 i. all or part of this liquid stream is recycled to the hydroformylation reactor.

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