

NOVEL PROCESS FLOW DIAGRAM FOR THE PRODUCTION OF BENZENE FROM REFORMATE WITHOUT A TOLUENE COLUMN

Context of the invention

5 The invention relates to the process flow diagram for fractionation in an aromatics complex. The aromatics complex is supplied with C6 to C10+ feeds and comprises a first step consisting of eliminating aliphatic compounds, i.e. saturated compounds of the paraffin type.

The second step is used to fractionate the aromatic species by number of carbons with a concatenation which generally comprises 4 columns known as the benzene column, toluene
10 column, xylenes column and heavy aromatics column, using the name of the products leaving from the head (except for the heavies column).

The reformat, any imports originating from units located outside the aromatics complex and the recycled streams originating from conversion units such as isomerization, transalkylation, disproportionation, etc, all supply this fractionation train at different levels depending on their
15 compositions.

The aim of the invention is to propose a process flow diagram for fractionation in an aromatics complex without a toluene column by adapting the specifications, in particular the cut points of the other columns of the complex in order to maintain correct function and the product specifications.

20 Examination of the prior art

The aromatics complex as a whole is generally represented as shown in the process flow diagram of Figure 1 below. However, that process flow diagram does not mention the stabilization columns present in the various conversion units (isomerization, transalkylation, disproportionation, etc).

25 In general, toluene is transalkylated or methylated in order to increase the production of paraxylene.

Managing the toluene, i.e. the set of actions which are used to maximize or minimize the production of toluene depending on the units, is carried out at different levels, denoted 1, 2, 3 and 4 in Figure 1:

1. The reformate splitter (a): the recovery of toluene in the side stream 3 is maximized in order to send it to the aromatics extraction unit(b). In fact, the C6/C7 cut of the reformates still contains too many aliphatic compounds for it to be sent directly to the fractionation train. In addition, the effluents from the catalytic units may contain cyclohexane, which cannot be separated from benzene by distillation. A portion of the benzene/toluene cut obtained from these units thus has to be treated using the aromatics extraction unit.
2. The benzene column (c) produces benzene, stream 9, which satisfies specifications for petrochemicals. The toluene content is thus minimal, which maximizes the recovery of toluene from the bottom of this column, stream 10.
3. The bottom of the toluene column (i) supplies the xylenes column (d), from which the distillate 12 is the main product from the complex (C8 aromatics). It is necessary to manage the toluene content in C8 aromatics, stream 12.

In this configuration, the stabilized effluent from transalkylation (A7 alone or A7 and A9/A10) contains aromatics containing 6 to 10 carbons which have to be returned directly to the benzene column so that this effluent can undergo fractionation in its entirety.

- 20 The term “transalkylation column” is used for any unit based on the principle of transalkylation between two aromatics. This definition thus includes the transalkylation of toluene and of the A9/A10 cut, of the A9/A10 cut alone, but also the transalkylation of toluene with itself, also known as toluene dismutation or disproportionation.

25 The patent US 4 041 091 describes a fractionation downstream of the transalkylation unit and does not specifically mention the toluene column, but the column known as the “BT column” may be equated to a C7-/C8+ splitter downstream of the transalkylation. That patent claims the integration of the condenser and reboiler of the column for a very precise process flow diagram. In contrast to the process in accordance with the present invention, the extraction of aromatics (of

the morphylane or sulpholane type) necessary to minimise the extraction of cyclohexane is not mentioned in that patent.

All of the patents concerning the separation of aromatics in the context of an aromatics complex employ a column known as a toluene column which separates toluene from xylenes. It is this
 5 column which is dispensed with in the present invention, with a saving in energy which is evaluated in the example below.

Brief description of the figures

Figure 1 represents the fractionation process flow diagram in accordance with the prior art.

Figure 2 represents the fractionation process flow diagram in accordance with the invention.

10 Figure 3 represents the fractionation process flow diagram in accordance with the invention in a variation in which the stabilization and separation unit (h) comprises only one step, denoted (h3).

Figure 4 represents the fractionation process flow diagram in accordance with the invention, in a variation in which the stabilization and separation unit (h) comprises two successive steps
 15 denoted (h1) and (h2).

Figure 5 represents the fractionation process flow diagram in accordance with the invention in a variation in which the stabilization and separation unit (h) comprises two successive steps denoted (h1) and (h2) and paraxylene (stream 23) is extracted from the C8 aromatics, denoted stream 12. The raffinate for this extraction, stream 24, is converted in an isomerization unit (k).
 20 In this case, the term “A8 loop” is used for the paraxylene extraction and the conversion of other isomers before recycling into the fractionation train.

Brief description of the invention

The present invention may be defined as a fractionation process employing an aromatics complex the feed for which is generally a reformat obtained from a catalytic gasoline reforming
 25 unit, and wherein the principal products are benzene and xylenes with a high level of purity. The xylenes may be produced as a mixture (ethylbenzene, metaxylene, orthoxylene, paraxylene) or

by isomer (in this case paraxylene, and possibly orthoxylene). It is then necessary to extract the desired isomers and convert the others.

The co-products from the aromatics complex are generally:

- a raffinate obtained from the aromatics extraction unit, composed of aliphatic species containing 6 to 7 carbon atoms,
- a heavy cut containing a minimum amount of naphthalene which cannot be upgraded in the complex, and which is a precursor of coke in the catalytic units,
- purges of uncondensable light products (reaction sections, stabilization columns).

More precisely, the fractionation process of an aromatics complex in accordance with the invention comprises a reformat separation unit (a), an aromatics extraction unit (b), a benzene separation column (c), a xylenes separation column (d), a unit for converting toluene by transalkylation (f), advantageously a heavy aromatics separation unit (e), a separation column (g) for effluents obtained from the toluene conversion unit (f) and a stabilization and separation unit (h) for light aromatics originating from the separation unit (g),

(a) the separation unit (a) for reformat 1 constituting the feed for the process is used in order to separate:

- overhead, a stream 2 which is the light aliphatic fraction of the feed containing hydrocarbons containing 5 carbon atoms,
- as a side stream, a stream 3, which is the light aromatic fraction of the feed, which is sent as a mixture with the stream 22 to form the stream 5 supplying the aromatics extraction unit (b),
- and a stream 4, which is the heavy aromatic fraction of the feed 1, containing aromatic hydrocarbons containing more than 8 carbon atoms composed mainly of aromatics,

(b) the aromatics extraction unit (b) supplied by the stream 5 produces:

- the stream 6, the raffinate from the aromatics extraction step not containing aromatics and which is a product from the process, and which is exported,
- the stream 7, the extract from the aromatics extraction step, containing benzene and toluene, this stream 7 being mixed with the stream 21, the light aromatic cut, stabilized and recycled downstream of the aromatics extraction unit in order to form the stream 8, the feed for the benzene separation step carried out in the column (c),
- (c) the benzene separation unit (c) is used to extract the overhead stream 9 which is the benzene produced by the complex, and from the bottom, the stream 10 which is mainly constituted by toluene, sent directly to the transalkylation unit (f),
- the heavy aromatic fraction of the feed 1, stream 4, is mixed with the heavy aromatic cut 19 extracted from the bottom of the step (g) for separation of effluents from the transalkylation unit (f) in order to form the stream 11 which is the feed for the xylenes separation unit (d),
- (d) the xylenes separation unit (d) is used to separate an overhead stream 12 which contains only C8 aromatics, and from the bottom a stream 13 constituted by an A9+ cut which is either exported from the complex or, advantageously, treated in a step (e) for separating heavy aromatics,
- (e) the heavy aromatics separation unit (e) can be used to recover an overhead stream 14 constituted by aromatics containing alkylbenzenes containing 9 to 10 carbon atoms, and from the bottom a stream 15 constituted by other A10+ hydrocarbons which cannot be upgraded by the usual conversion units,
- (f) the transalkylation unit (f) is supplied with the stream 16 which results from adding the stream 10 from the bottom of the benzene separation column (c) to the stream 14, the overhead stream from the heavy aromatics separation column (e), and produces a transalkylation effluent, stream 17, which is sent to the separation unit (g),

- (g) the separation unit (g) for effluents from the transalkylation unit (f) produces an overhead stream 18 of light aromatics which is supplied to the stabilization and separation unit (h), and from the bottom, the stream 19, the heavy aromatic cut,
- (h) the stabilization and separation unit (h) for the light aromatic cut supplied by the stream 18 can be used to divide the recycle of hydrocarbons containing 6 and 7 carbon atoms constituting the stream 21 which is sent to the benzene separation unit (c) as a mixture with the stream 7, and the stream 22 which is recycled to the aromatics extraction step (b), as well as the stream 20 constituting the purge gas. This stream 20 is mainly constituted by hydrocarbons containing 1 to 5 carbon atoms.

In a first variation of the process in accordance with the invention, the unit (h) for stabilization of the light aromatic cut 18 comprises a single step (h3) from which the stabilized product is extracted which is divided into two streams 21 and 22 as a function of the requirement to extract cyclohexane.

- 15 In a second variation of the fractionation process in accordance with the invention, the stabilization and separation unit (h) for the light aromatic cut 18 comprises a first step (h1) for separation which can be used to separate the stream 21 from the rest of the stream 18, and a second step (h2) into which the residual stream 23 returns, and from which the stream 22 is extracted, which is recycled to the aromatics extraction unit (b).
- 20 In accordance with another variation of the fractionation process of an aromatics complex in accordance with the invention, a loop A8 for the production of paraxylene is installed in said process, said loop A8 being supplied with the stream 12 containing the C8 aromatics. The C8 aromatics are separated in a paraxylene separation unit (j) which produces paraxylene, stream 23, and a raffinate, stream 24. This raffinate is treated in a conversion unit (k) which is intended to
- 25 produce paraxylene from other isomers. The effluent 25 is separated into two cuts of which the heavy fraction, stream 27, is recycled directly to the xylenes separation unit (d). The remaining light fraction, stream 26, is then mixed with the stream 18 originating from the transalkylation unit (f).

In general, the extraction of paraxylene in the context of the present process is carried out using a simulated moving bed process.

In accordance with another variation of the fractionation process of an aromatics complex in accordance with the present invention, a xylenes isomerization unit is employed in order to
5 dealkylate the ethylbenzene.

In accordance with another variation of the fractionation process of an aromatics complex in accordance with the present invention, a xylenes isomerization unit is also employed in order to isomerize the ethylbenzene into xylenes.

In accordance with another variation of the fractionation process of an aromatics complex in
10 accordance with the present invention, the transalkylation unit is a toluene disproportionation unit.

Finally, in accordance with another variation of the fractionation process of an aromatics complex in accordance with the present invention, the transalkylation unit is a unit for the transalkylation of toluene with an aromatic cut containing 9 and/or 10 carbon atoms.

15 **Detailed description of the invention**

The invention pertains to changing the process flow diagram for fractionation of an aromatics complex.

In the remainder of the text, the notation "A8+" will often be used to signify all aromatic compounds containing 8 and more carbon atoms. In the same manner, "A9+" designates all
20 aromatic compounds containing more than 9 carbon atoms, and so on. Hydrocarbon compounds containing no aromatic rings are termed "aliphatic".

In accordance with the reference process flow diagram corresponding to the prior art (see Figure 1), the toluene column essentially acts to separate the A8+ originating from toluene transalkylation.

25 The present invention describes a fractionation process for the aromatics complex in which the cut point for the effluents fractionation column of the transalkylation unit is changed, and the

toluene column is dispensed with. The light aromatic cut constituted by the benzene/toluene cut, denoted BT, is withdrawn from the head of the stabilization column. In this manner, both the A8+ content in the BT cut is controlled, and the toluene content in the column bottom product is controlled.

- 5 Since the toluene content is controlled, the column bottom product can be sent directly to the xylenes separation unit the function of which is to separate the A8 from the A9+ compounds. The overhead cut is the benzene/toluene cut which is not stabilized.

In practice, the aim is to minimize the quantity of product to be treated by the C6/C7 aromatics extraction unit. It is not necessary to treat the whole of the A6/A7 cut obtained from
 10 the transalkylation in order to obtain the required benzene purity. In the prior art process flow diagram, this is adjusted by adapting the benzene recovery between the head and bottom of the stabilization column for transalkylation.

In the novel process flow diagram in accordance with the invention, the BT cut (ideally benzene alone) is split into two in order to send to the aromatics extraction only the quantity which is
 15 necessary for purification in order to comply with the "benzene" product purity requirement.

In more detail, the description of the process flow diagram of the process in accordance with the invention may be given using the following nomenclature and following the process flow diagram of Figure 2.

The aromatics complex in accordance with the invention comprises the following units:

- 20 (a) reformat separation unit
- (b) aromatics extraction unit
- (c) benzene separation unit
- (d) xylenes separation unit
- (e) heavy aromatics separation unit (advantageously employed)
- 25 (f) transalkylation unit

- (g) effluents separation unit of the transalkylation unit
- (h) stabilization and separation unit for the light aromatic cut extracted in the effluent separation step of the transalkylation unit

The streams moving between the various units or communicating with the environment of the process (feeds or products) are as follows, referring to Figure 2:

- 1) feed for aromatics complex
- 2) light aliphatic fraction of the feed
- 3) light aromatic fraction of the feed
- 4) heavy aromatic fraction of the feed
- 5) feed for aromatics extraction step
- 6) raffinate from aromatics extraction step
- 7) extract from aromatics extraction step
- 8) feed for benzene separation step
- 9) benzene produced by the complex
- 10) toluene extracted from the benzene separation step
- 11) feed for the xylenes separation step
- 12) C8 aromatics
- 13) A9+ cut extracted in the xylenes separation step
- 14) A9/A10 cut extracted from the heavy aromatics separation step (in the case in which a heavy aromatics separation unit (e) is present)
- 15) A10+ cut extracted from heavy aromatics separation step (in the case in which a heavy aromatics separation unit (e) is present)

16) feed for transalkylation unit

17) effluents from transalkylation unit

18) light aromatic cut extracted from the effluent separation step of the transalkylation unit

19) heavy aromatic cut extracted from the effluent separation step of the transalkylation unit

20) C5- cut extracted from light aromatic cut

21) light aromatic cut, stabilized and recycled downstream of the aromatics extraction unit

22) light aromatic cut, stabilized and recycled upstream of the aromatics extraction unit

The aromatics complex is supplied with the feed for the complex 1. This stream, which is rich in aromatics, contains hydrocarbons containing 5 to 11 carbon atoms which are rich in aromatics. It is generally a stabilized reformat. This stream is treated in the reformat separation step (a). The stream 2 is the light aliphatic fraction of the feed and contains hydrocarbons containing 5 carbon atoms and by its nature does not contain any aromatics. The light aliphatic fraction of the feed is a co-product of the complex and leaves the aromatics complex.

The reformat separation step (a) produces the stream 3, the light aromatic fraction of the feed, and the stream 4, the heavy aromatic fraction of the feed. The light aromatic fraction of the feed 3 contains hydrocarbons containing 6 to 7 carbon atoms. It is rich in aromatics, but contains a lot of aliphatic compounds. Thus, it is destined to be treated in the aromatics extraction unit (b). The heavy aromatic fraction of the feed 4 contains hydrocarbons containing more than 8 carbon atoms composed mainly of aromatics. The aliphatic compounds are present in very small quantities and do not require extraction using a dedicated unit.

The light aromatic fraction of the feed 3 is mixed with the stream 22 which is the light aromatic cut, stabilized and recycled upstream of the aromatics extraction unit, originating from the step (h) for stabilization and separation of the light aromatic cut extracted from the effluents from the transalkylation unit (f). The stream 5 obtained thereby is the feed for the aromatics extraction

step (b). This unit can be used to separate the aliphatic compounds from the aromatic compounds, generally by solvent extraction. The stream 6, the raffinate from the aromatics extraction step, is another co-product of the complex which does not contain aromatics and is therefore exported.

- 5 The stream 7, the extract from the aromatics extraction step, contains benzene and toluene. This stream is mixed with the stream 21, the light aromatic cut, stabilized and recycled downstream of the aromatics extraction unit, in order to form the stream 8, the feed for the benzene separation step. The benzene separation step (c) may be used to extract the stream 9, which is the benzene produced by the complex. It is generally a distillation column the stream 9 from which is the
10 overhead product. The benzene produced by the complex, stream 9, contains only benzene which complies with the specifications for petrochemicals, for which it is destined. The remainder of the stream 8 forms the stream 10 which is thus the toluene extracted from the benzene separation step. Because of the fractionation configuration, this stream contains a very small quantity of hydrocarbons containing more than 8 carbon atoms and thus may be sent
15 directly to the transalkylation unit (f).

- At the same time, the heavy aromatic fraction of the feed, stream 4, is mixed with the heavy aromatic cut extracted from the effluents separation step of the transalkylation unit, stream 19, in order to form the stream 11 which is the feed for the xylenes separation step (d). This xylenes separation step (d) may be used to separate a stream containing only C8 aromatics, stream 12.
- 20 This stream thus contains ethylbenzene and the 3 isomers of xylene. Depending on the configuration of the complex, the C8 aromatics may be exported from the complex as the major product, or be treated in extraction and conversion units in order to produce products with a higher added value such as paraxylene.

- The xylenes separation step (d) also produces an A9+ cut extracted from the xylenes separation
25 step, stream 13. This stream may either be exported from the aromatics complex, or advantageously be treated in a step (e) for separating heavy aromatics. This step may be used to recover aromatics containing alkylbenzenes containing 9 and 10 carbon atoms in an A9/A10 cut extracted from the heavy aromatics separation step, stream 14. The other hydrocarbons which cannot be upgraded by the conversion units which are known to the person skilled in the art are

then purged and constitute the A10+ cut extracted from the heavy aromatics separation step, stream 15.

The transalkylation unit (f) is then supplied with the stream 16 which originates from mixing the stream 10, toluene, extracted from the benzene separation step, and advantageously an A9/A10 cut extracted from the step for separating heavy aromatics constituting the stream 14. The feed 5 16 is converted by a transalkylation reaction mechanism which can displace the alkyl groups from one compound to another. The transalkylation unit (f) produces xylenes, starting from molecules containing 7, 9 and 10 carbon atoms. The effluents from the transalkylation unit, stream 17, generally contain aromatics containing 6 to 10 carbon atoms, cracking products 10 (methane, ethane, propanes, etc) and some naphthenes obtained from a side reaction of hydrogenation of the aromatic rings, in particular of cyclohexane. If the feed contains toluene alone, then it is known as toluene dismutation or disproportionation.

Bearing the species present in the effluents from the transalkylation unit (f) in mind, the stream 17 then has to be separated and stabilized in order to fit in with the various products from the 15 complex.

In accordance with the invention, the effluents from the transalkylation unit, stream 17, are initially separated in the effluents separation step (g) of the transalkylation unit. The heavy aromatic cut extracted from the effluents separation step of the transalkylation unit, stream 19, contains aromatics containing 8 and more carbon atoms. It is recycled to the xylenes separation 20 step (d).

The light aromatic cut extracted from the effluents separation step of the transalkylation unit, stream 18, contains aromatics containing 6 and 7 carbon atoms (benzene and toluene). It is not stabilized and also contains naphthenes obtained from a side reaction of hydrogenation of the aromatic rings, in particular of cyclohexane.

25 The step (h) for stabilization and separation of the light aromatic cut can be used to remove the compounds containing 5 and fewer carbon atoms from the stream 18, and of dividing the recycle of hydrocarbons containing 6 and 7 carbon atoms. In fact, the stream 18 contains cyclohexane in particular, which cannot be separated from benzene by distillation because of a difference of less than 1°C between the boiling points. For this reason, the benzene separation step (c) cannot be

used to separate benzene from cyclohexane. In order to satisfy the specifications for benzene produced by the complex, stream 9, it is necessary to extract a sufficient quantity of the cyclohexane. The invention allows step (h) to be used to divide the recycle of hydrocarbons containing 6 and 7 carbon atoms. A quantity is recycled to the inlet to the aromatics extraction unit (b) in order to extract the cyclohexane contained in the stream 22. The remainder, stream 21, is recycled directly to the benzene separation step (b). This arrangement can be employed in order to satisfy the specifications for purity of the benzene produced by the aromatics complex, stream 9, while minimizing the quantities recycled to the aromatics extraction unit (b).

Two embodiments for step (h) for the stabilization and separation of the light aromatic cut are represented, in a non-exhaustive and non-limiting manner.

In accordance with the first embodiment, the stream 18 is stabilized in a stabilization step (h3). The stabilized product is then simply divided into two streams 21 and 22 as a function of the cyclohexane extraction requirement.

In accordance with the second embodiment, the stream 18 initially feeds a separation step (h1) which can be used to separate the stream 21 from the rest of the stream 18. The residual stream 23 is not yet stabilized; this is carried out by means of step (h2), which is generally carried out using a distillation column known as a stripper. The stabilized product then forms the stream 22 which is recycled to the aromatics extraction unit (b). Although it is more complicated, this embodiment can be used to avoid recycling the C7 cut of the stream 18, which mainly contains toluene, to the aromatics extraction unit (b).

Advantageously, the separation process flow diagram in accordance with the invention may be supplemented in order to produce paraxylene, stream 23 (see Figure 5). The C8 aromatics, stream 12, are then treated in a paraxylene extraction unit (j). The raffinate, stream 24, from this unit is composed of ethylbenzene, orthoxylene and metaxylene. In order to increase the paraxylene productivity of the complex, the raffinate is converted in an isomerization unit (k). The two isomers of paraxylene are then partially converted into paraxylene by isomerization. The ethylbenzene may either be dealkylated in order to form benzene, or also isomerized in order to produce xylenes. The effluents, stream 25, are separated in a separation step l). The heavy fraction composed of C8+, denoted the stream 27, is recycled to the xylenes extraction unit (d);

the non-stabilized light fraction, denoted stream 26, is mainly composed of benzene and toluene, and is mixed with the stream 18 before being treated in the stabilization and separation unit (h) for the light aromatic cut.

Examples in accordance with the invention

- 5 The example compares the reference process flow diagram in accordance with the prior art (see Figure 1) with the process flow diagram in accordance with the invention represented in Figure 4.

The transalkylation unit (f) is a unit treating toluene extracted from the benzene separation step, stream 10, and the A9/A10 cut extracted from the heavy aromatics separation step, stream 14.

- 10 The treated reformat has the composition shown in Table 1 below.

In both cases, the paraxylene production was 144.0 t/h, and that for benzene was 53.6 t/h for a reformat flow rate of 250 t/h.

C5-	1.7%
C6 non-ar	5.8%
C7 non-ar	6.1%
C8+ non-ar	0.7%
A6	6.6%
A7	24.8%
A8	30.9%
A9	17.7%
A10	4.8%
A11	0.8%

Table 1: Composition of reformat at inlet to aromatics complex (% by weight)

- 15 The series of columns involved in the process flow diagram in accordance with the invention is shown in Table 2 below. The process flow diagram in accordance with the invention results from the removal of the toluene column and the appearance of a column termed the local benzene column, step (h1).

The cumulative savings in reboiler energy for the columns in the process flow diagram in accordance with the present invention was 20 MW, for a reference value of 92.1MW. The energy saving was thus 22% in the case which has been presented.

	Columns						
	Benzene	Stabilization transalkylation	Stripper	Toluene	Local benzene	Total	
Prior art	37.4	10.0	1.0	43.6	-	92.1	
Invention	31.8	30.4	2.2	-	7.4	71.8	

Table 2: Reboiler energies for columns involved in the modification to the fractionation process flow diagram (MW)

CLAIMS

1. A fractionation process of an aromatics complex comprising a reformat separation unit (a), an aromatics extraction unit (b), a benzene separation column (c), a xylenes separation column (d), a unit for converting toluene by transalkylation (f), a heavy aromatics separation unit (e), a separation column (g) for effluents obtained from the toluene conversion unit (f) and a stabilization and separation unit (h) for light aromatics originating from the separation unit (g), in which process:
 - (a) the separation unit (a) for reformat (1) constituting the feed for the process is used in order to separate:
 - overhead, a stream (2) which is the light aliphatic fraction of the feed containing hydrocarbons containing 5 carbon atoms,
 - as a side stream, a stream (3), which is the light aromatic fraction of the feed, which is sent as a mixture with the stream (22) to form the stream (5) supplying the aromatics extraction unit (b),
 - and a stream (4), which is the heavy aromatic fraction of the feed (1), containing aromatic hydrocarbons containing more than 8 carbon atoms composed mainly of aromatics,
 - (b) the aromatics extraction unit (b) supplied by the stream (5) produces:
 - the stream (6), the raffinate from the aromatics extraction step not containing aromatics and which is a product from the process, and which is thus exported,
 - the stream (7), the extract from the aromatics extraction step, containing benzene and toluene, this stream (7) being mixed with the stream (21), the light aromatic cut, stabilized and recycled downstream of the aromatics extraction unit in order to form the stream (8), the feed for the benzene separation step carried out in the column (c),

- (c) the benzene separation unit (c) is used to extract the overhead stream (9) which is the benzene produced by the complex, and from the bottom, the stream (10) which is mainly constituted by toluene, sent directly to the transalkylation unit (f),
- 5 • the heavy aromatic fraction of the feed (1), stream (4), is mixed with the heavy aromatic cut (19) extracted from the bottom of the step (g) for separation of effluents from the transalkylation unit (f) in order to form the stream (11) which is the feed for the xylenes separation unit (d),
- 10 (d) the xylenes separation unit (d) is used to separate an overhead stream (12) which contains only C8 aromatics, and from the bottom a stream (13) constituted by an A9+ cut which is either exported from the complex or, advantageously, treated in a step (e) for separating heavy aromatics,
- 15 (e) the heavy aromatics separation unit (e) can be used to recover an overhead stream (14) constituted by aromatics containing alkylbenzenes containing 9 to 10 carbon atoms, and from the bottom a stream (15) constituted by other A10+ hydrocarbons which cannot be upgraded by the usual conversion units,
- 20 (f) the transalkylation unit (f) is supplied with the stream (16) which results from adding the stream (10) from the bottom of the benzene separation column (c) to the stream (14), the overhead stream from the heavy aromatics separation column (e), and produces an alkylation effluent, stream (17), which is sent to the separation unit (g),
- 25 (g) the separation unit (g) for effluents from the transalkylation unit (f) produces an overhead stream (18) of light aromatics which is supplied to the stabilization and separation unit (h), and from the bottom, the stream (19), the heavy aromatic cut extracted at the effluent separation step of the transalkylation unit, stream (19),
- (h) the stabilization and separation unit (h) for the light aromatic cut supplied by the stream (18) can be used to divide the recycle of hydrocarbons containing 6 and 7 carbon atoms constituting the stream (21) which is sent to the benzene

separation unit (c) as a mixture with the stream (7), and the stream (22) which is recycled directly to the aromatics extraction step (b), as well as the stream (20) constituting the purge gas, mainly constituted by hydrocarbons containing 1 to 5 carbon atoms.

- 5 2. The fractionation process of an aromatics complex as claimed in claim 1, in which the unit (h) for stabilization and separation of the light aromatic cut (18) comprises a single step (h3) from which the stabilized product is extracted which is divided into two streams (21) and (22) as a function of the requirement to extract cyclohexane.

- 10 3. The fractionation process of an aromatics complex as claimed in claim 1, in which the stabilization and separation unit (h) for the light aromatic cut (18) comprises a first step (h1) for separation which can be used to separate the stream (21) from the rest of the stream (18), and a second step (h2) into which the residual stream (23) returns, and from which the stream (22) is extracted, which is recycled to the aromatics extraction unit (b).

- 15 4. The fractionation process of an aromatics complex as claimed in claims 1 to 3, in which a loop A8 for the production of paraxylene is installed in said process, said loop A8 being supplied with the stream (12) containing the C8 aromatics. The C8 aromatics are separated in a paraxylene separation unit (j) which produces paraxylene, stream (23), and a raffinate, stream (24). This raffinate is treated in a conversion unit (k) which is intended to produce paraxylene from other isomers. The effluent (25) is separated into

20 two cuts of which the heavy fraction, stream (27), is recycled directly to the xylenes separation unit (d). The remaining light fraction, stream (26), is then mixed with the stream (18) originating from the transalkylation unit (f).

5. The fractionation process of an aromatics complex as claimed in claim 4, in which the extraction of paraxylene is carried out using a simulated moving bed process.

- 25 6. The fractionation process of an aromatics complex as claimed in claim 4, in which a xylenes isomerization unit is employed in order to dealkylate the ethylbenzene.

7. The fractionation process of an aromatics complex as claimed in claim 4, in which a xylenes isomerization unit is also employed in order to isomerize the ethylbenzene into xylenes.
8. The fractionation process of an aromatics complex as claimed in claim 1, in which the
5 transalkylation unit is a toluene disproportionation unit.
9. The fractionation process of an aromatics complex as claimed in claim 1, in which the transalkylation unit is a unit for the transalkylation of toluene with an aromatic cut containing 9 and/or 10 carbon atoms.