Conceptual Flow Diagrams

Un Croquis vaut mieux qu'un long discours
(A picture is worth a thousand words)

Napoleon Bonaparte

Understanding Chemical Processes

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- Block Flow Diagram (BFD)
- Process Flow Diagram (PFD)
- Piping and Instrumentation Diagram (P & ID)

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Toluene and hydrogen are converted in a reactor to produce benzene and methane. The reaction does not go to completion, and excess toluene is required. The noncondensable gases are separated and discharged. The benzene product and the unreacted toluene are then separated by distillation. The toluene is then recycled back to the reactor and the benzene removed in the product stream.

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Draw the BFD, PFD, and P & ID diagrams for this process.

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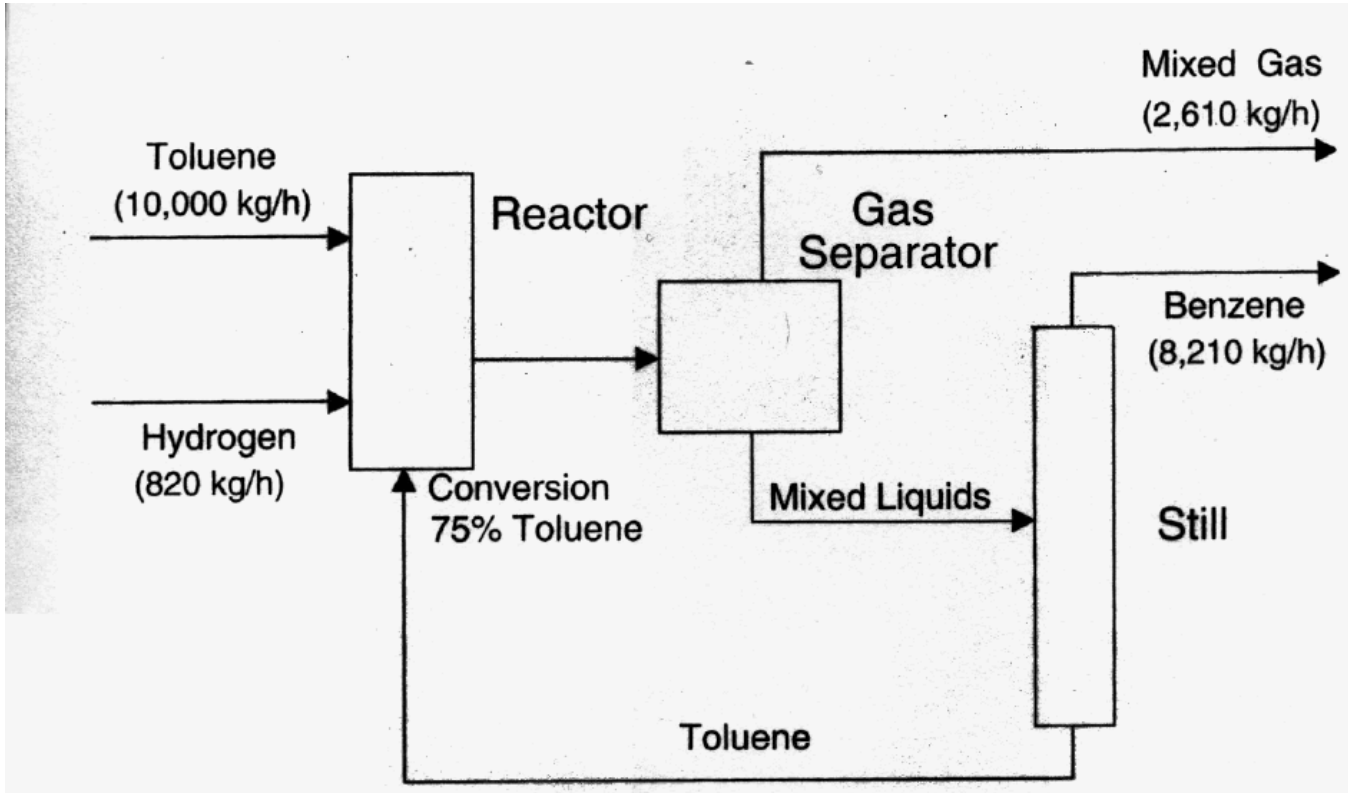

Reaction : $C_7H_8 + H_2 \rightarrow C_6H_6 + CH_4$

Block Flow Process Diagram for the Production of Benzene

Conventions and Format for BFD

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- Simplified material balance provided

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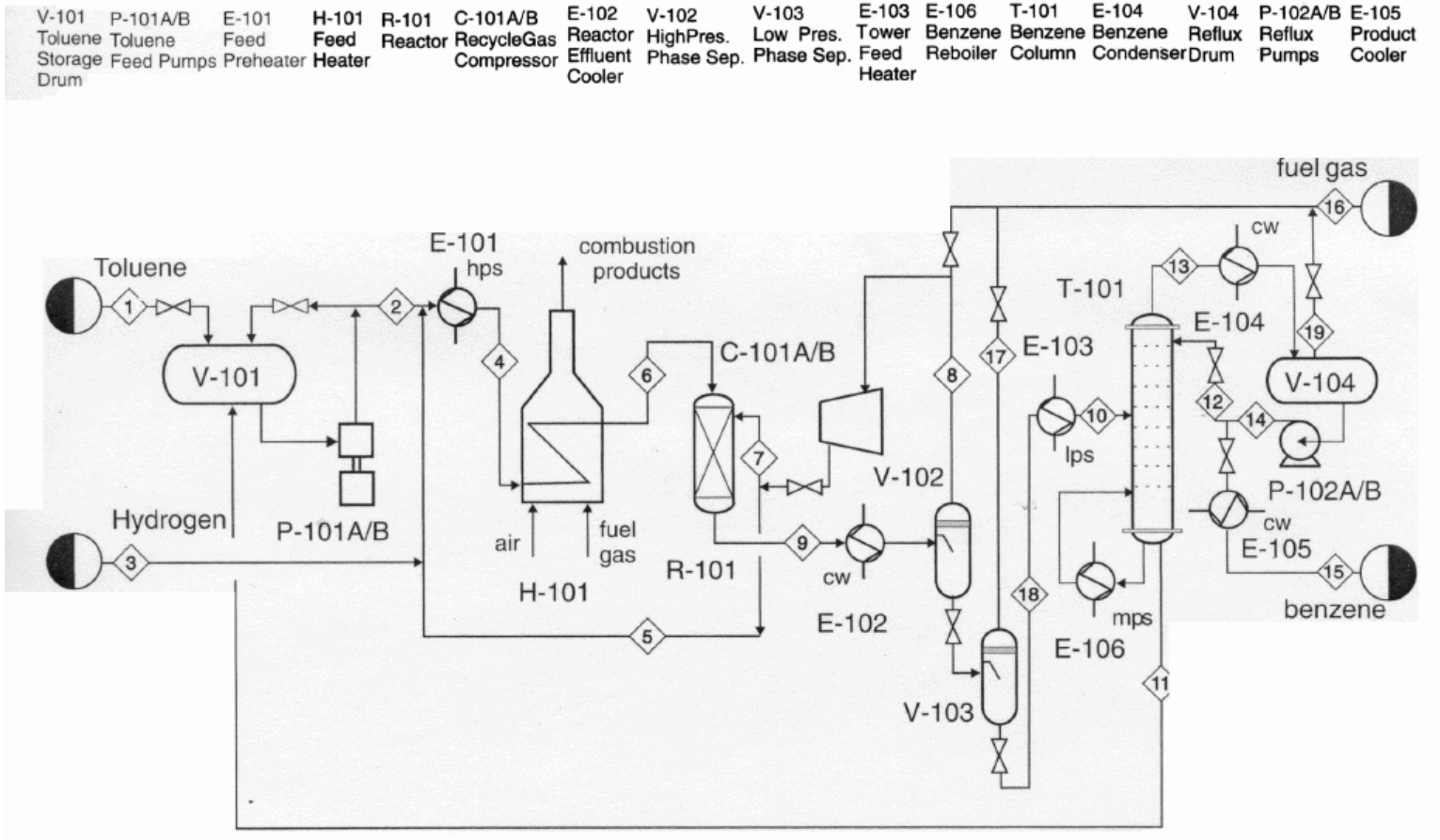

Figure 1.3 Skeleton Process Flow Diagram (PFD) for the Production of Benzene via the Hydrodealkylation of Toluene

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- All utility streams supplied to a major equipment are shown.

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In this course, when we say PFD, we mean skeleton PFD.

Piping & Instrumentation Diagram

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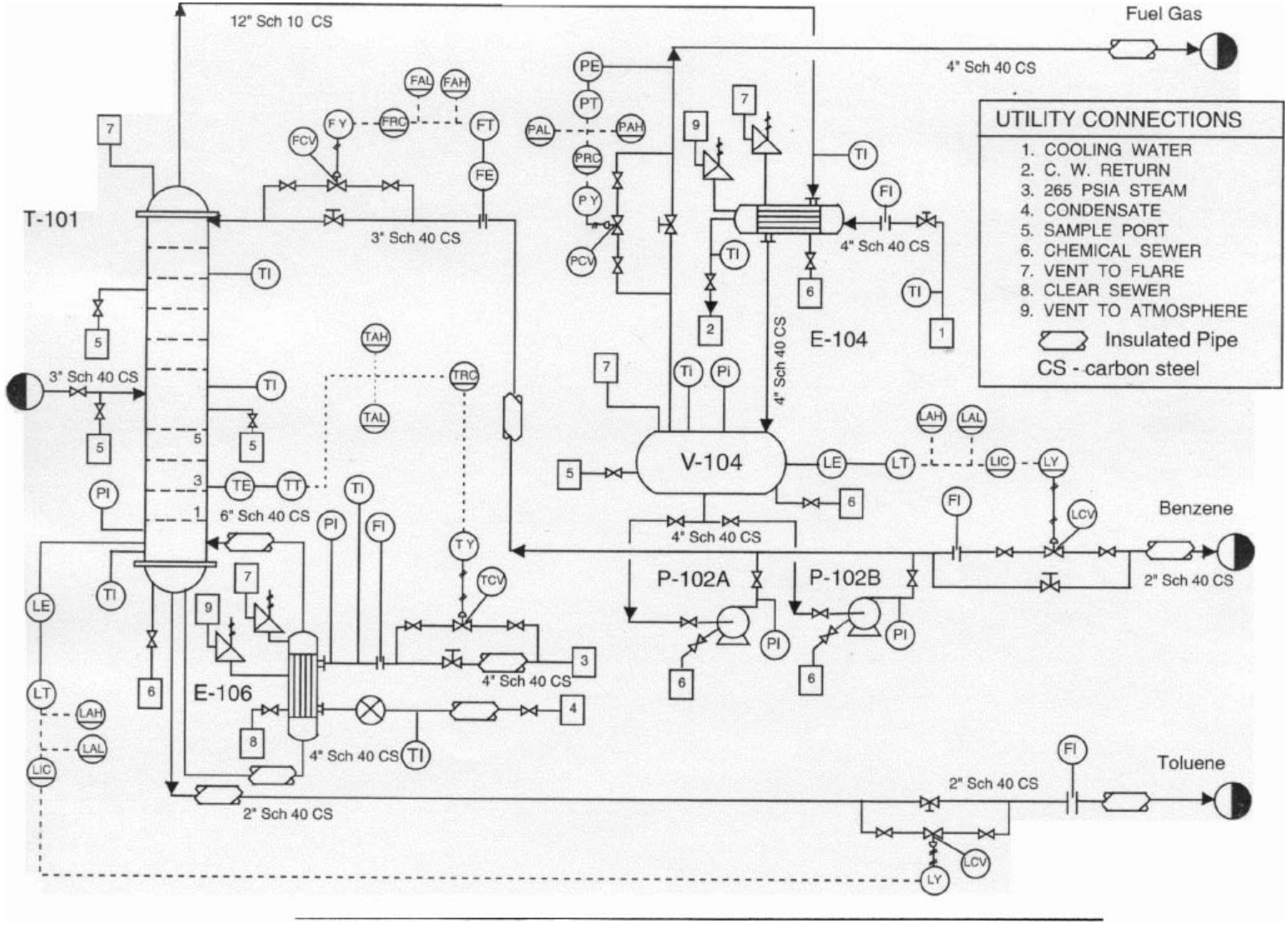

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Based on the information in this diagram:

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We will talk more about P&IDs in ECH 4323