

PERANCANGAN PROSES KIMIA (*CHEMICAL PROCESS DESIGN*)

Kode Mata Kuliah : TKK 345 (New Curriculum)
Beban : 3 SKS

Section 2 oleh: Dr. Istadi, ST, MT

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Literatures:

- Seider, W.D., J.D. Seider, Lewin, D.R., 2004, *Product & Process Design Principles: Synthesis, Analysis and Evaluation*, John Wiley & Sons, Inc., New York
- Turton, R., Bailie, R.C., Whiting, W.B., Shaeiwitz, J.A., 2003, *Analysis, Synthesis and Design of Chemical Process*, Prentice Hall PTR, New Jersey

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TIK

- Mampu memahami prinsip dasar dan tahap-tahap perancangan proses kimia.
- Mampu memahami dan menjelaskan struktur dan sintesis proses pada flow diagram.
- Mampu memahami dan menjelaskan rule of thumb sintesis proses kimia
- Mampu memilih system separator dan system reactor pada proses kimia
- Mampu menggunakan software/simulator untuk sintesis dan simulasi proses kimia
- Mampu memahami dan menjelaskan dasar-dasar sintesis jaringan pemanas, reaktor, dan separator.
- Mampu mendesain jaringan pemanas, reaktor, dan separator dengan efisiensi yang tinggi.

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SILABUS

- Prinsip Dasar dan Tahap-tahap Perancangan Proses Kimia
- Struktur dan Sintesis Process Flow Diagram
- Heuristic/Rule of Thumb Sintesis Proses
- Pemilihan Sistem Separator
- Pemilihan Sistem Reaktor
- Simulator/Software untuk Sintesis dan Simulasi Proses
- Dasar-dasar Sintesis Jaringan Pemanas
- Desain Jaringan Reaktor-Separator
- Konsep Integrasi Proses
- Studi Kasus.

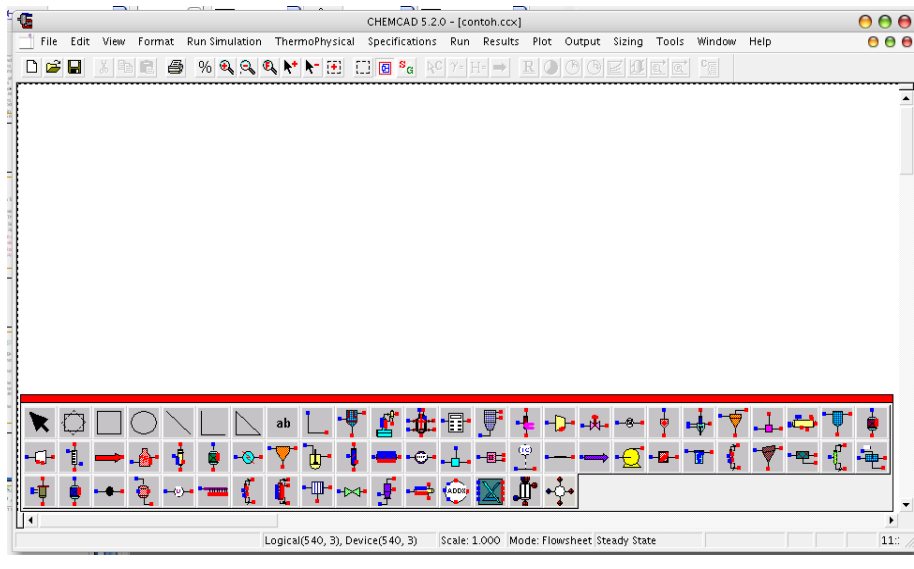
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Rancangan Kuliah Section 2

1. **Dasar-dasar Penggunaan CHEMCAD/HYSYS**
2. Perancangan Sistem/jaringan Reaktor
3. Tugas 1 dan Pembahasannya
4. Perancangan Sistem/jaringan Pemanas
5. Perancangan Sistem/jaringan Separator & Recycle
6. Tugas 2 dan Pembahasannya
7. Studi Kasus
8. Ujian Section 2

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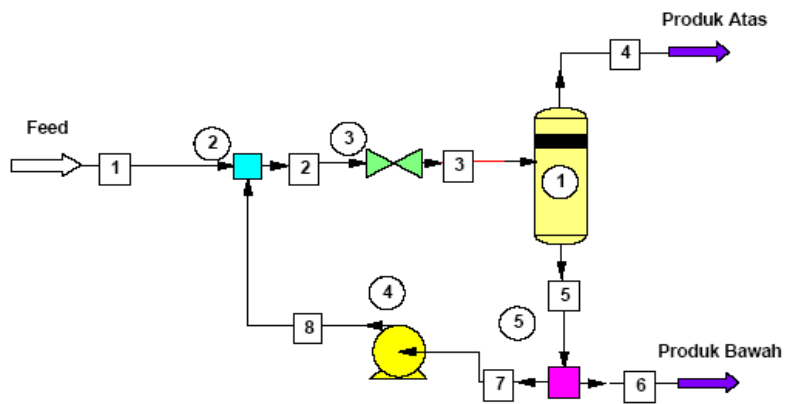
DASAR-DASAR PENGGUNAAN CHEMCAD / HYSYS



Flash & Recycle

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FLASH WITH RECYCLE



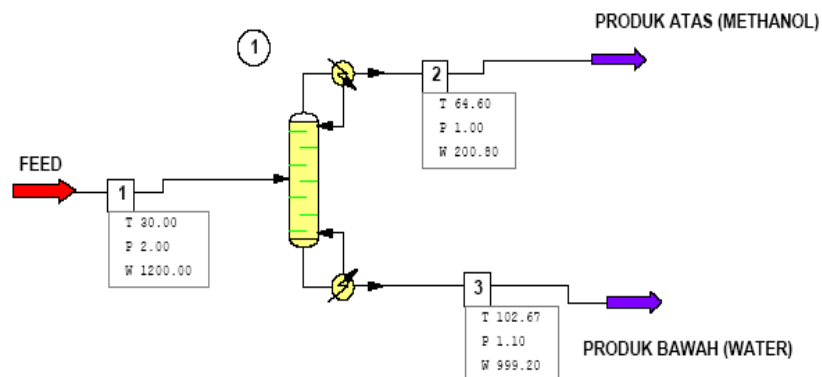
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DISTILLATION COLUMN

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Shortcut Column untuk Prediksi Jumlah Stage dan Feed Stage

SHORTCUT COLUMN
(setelah jumlah tray ketemu baru ke distilasi jenis lainnya untuk simulasi)



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Shortcut Column Specification

- Shortcut Column (SHOR) -

Select mode: 2 Design: FUG with Fenske feed tray location ID: 1

Select condenser type: 0 Total

Column pressure: 1 atm

Column pressure drop: 0.1 atm

Number of stages: 19.3493

Reflux ratio:

R/Rmin: 1.4

Case Study

Number of points:

Lower bound R/Rmin:

Upper bound R/Rmin:

Key Component Specifications

Light key component: 1 Methanol

Light key split: 0.999

Heavy key component: 2 Water

Heavy key split: 0.001

Calculated Results

Condenser duty: -1048.17 MJ/h

Reboiler duty: 1371.16 MJ/h

Minimum stages: 10.8479

Feed stage: 10.1746

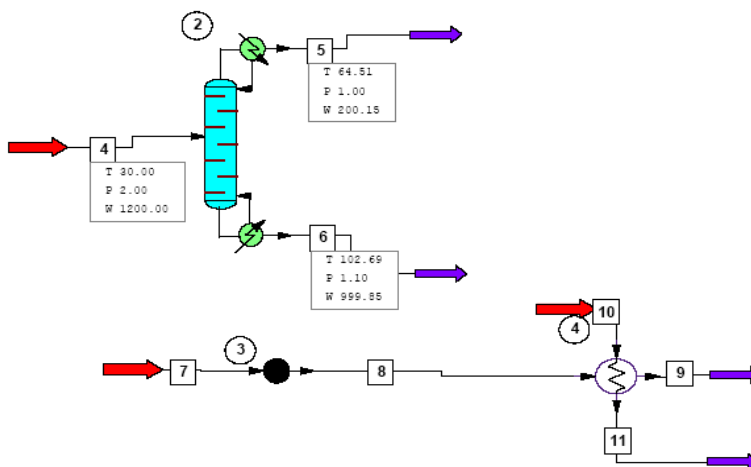
Reflux ratio, minimum: 2.65379

Reflux ratio, calculated: 3.7153

Help Cancel OK

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Plate Column from Shortcut Column



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Plate Column Specification

The screenshot shows the 'General Model Parameters' dialog box for a 'TOWER Distillation Column'. The dialog has five tabs: 'General', 'Specifications', 'Convergence', 'Cost Estimation 1', and 'Cost Estimation 2'. The 'Specifications' tab is active. The 'ID' is 2. The parameters are as follows:

Parameter	Value	Unit
Condenser type	0 Total or no condenser	
Subcooled temp.		C
Top pressure	1	atm
Cond press drop		atm
Colm press drop	0.1	atm
No. of stages	20	
Feed stages:		
Feed tray for stream	4 11	

Buttons: Help, Cancel, OK.

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The screenshot shows the 'Heat and Material Balance Specifications' dialog box for a 'TOWER Distillation Column'. The dialog has five tabs: 'General', 'Specifications', 'Convergence', 'Cost Estimation 1', and 'Cost Estimation 2'. The 'Specifications' tab is active. The 'ID' is 2. The parameters are as follows:

Parameter	Value	Unit
Condenser mode:	1 Reflux ratio (R/D)	Specification
Reflux ratio (R/D)	3.75	
Select reboiler mode:	2 Reboiler duty, positive	Specification
Reboiler duty, positive	1371.16	MJ/h

Buttons: Help, Cancel, OK.

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