



SUBJECT DATASHEET

Semester:	2009/10/2
Subject:	Hydrocarbon Processing II
Code:	VEMKOL4223A
Responsible department:	Department of Hydrocarbon and Coal Processing
Responsible department code:	MKOL
Responsible lecturer:	Zsuzsanna Marton

Educational objectives:

To give an overall view of a method of the crude oil distillation calculation, and its application. To acquire the principles of design/sizing of special equipments used in the oil industry.

Detailed content of the subject:

Calculation of crude oil distillation 1. Differences between conventional and crude oil columns. Basic processes for atmospheric crude distillation. Atmospheric tower feed data. Separation criteria in petroleum fractionation. Tower data. Utilities. 2. Estimation of crude oil properties. Feed temperature. 3. Pressure of the flash zone. Material balance of the flash zone. 4. Heat balance of the flash zone. Temperature of flash zone. 5. Prediction of product distillation yields. 6. Material balance around the product stripper. 7. Properties of all streams of tower. 8. Estimation of draw tray temperatures. Temperature and pressure profile for the tower. 9. First sidestream product draw tray. Heat and material balance. 10. Other sidestream product draw trays. Heat and material balances. 11. Top tray. Condenser. Heat and material balances. Overall heat balance. 12. Fractionation capability of the system. Conclusions. 13. Simulation of crude oil distillation with pseudocomponent by simulation software. 14. Simulation of crude oil distillation with pseudocomponent by simulation software 15. Examination paper. Design/sizing of equipments used in the oil industry 1. Petroleum refining process correlations. Utilization practice of the HPI Consultants software package contains: HPI crude oil assay, handbook and database, Petroleum refining process correlation, Property predictor. 2. Petroleum product blending. Utilization practice of the HPI Consultants software: Blend-cp, Multi-purpose blending optimiser for crude and products. 3. Design of storage tanks, introduction. Estimation of evaporation losses I. 4. Estimation of evaporation losses II. Pumps and compressors used in the oil industry. Introduction. 5. Utilization practice of the design software for pumps (CPPAC- program for centrifugal pump application engineers form Gulf Publishing) and compressors (Chemcalc 15-compressor rating application, Gulf Publishing). 6. Vacuum pumps, ejectors. 7. Examination paper 8. Fired heaters. Mechanism of heat transfer. 9. Examination paper. 10. Design of horizontal type fired heater (example). 11. Design of the reactors. 12. Sizing of pipelines I. 13. Sizing of pipelines II. (example). (WinpipeD, Inplant 4.0) 14. Plantspace design. 15. Examination paper.

Requirements:

Rating the personal performance is done based on an examination paper and individual report. In the examination papers theoretical assignments and calculations are to be solved.



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Required and suggested references:

1. Watkins, R.N.: Petroleum Refinery Distillation, 2. API Technical Data Book - Petroleum Refining, 1992
3. Ludwig, E.: Applied Process Design for Chemical and Petrochemical Plants, Vol. 1-3., Gulf Publ. Co., 1983
4. Pálffy: Vegyipari készülékek, Szerkesztési atlasz.
5. Evans, F.M.: Equipment Design Handbook for Refineries and Chemical Plants., Vol. 1-2., Gulf Publ. Co., 1980
6. Deák, Marton, Varga: Kőolajipari számítások, Veszprém, 2005., Egyetemi jegyzet
7. Marton Zs.: Kőolajipari számítások III., Veszprém, 1996., Egyetemi jegyzet
8. Miskolczi, N.: Eljárásstervezés IV., Veszprém, 2006., Egyetemi jegyzet
9. Blend-CP, Multi Purpose Blending Optimiser (Crude&products) User's Manual; HPI Consultants Inc. 2001
10. Prop-PR, Property Predictor User's Manual; HPI Consultants Inc. 2001
11. Petroleum Refining Process Correlation; HPI Consultants Inc. 2001
12. HPI Crude Oil Assay Handbook and Database, HPI Consultants Inc. 2001
13. D.B. Gelfand: Fired Heaters and Furnaces; UOP Design Engineering Seminar, 1990