

Operações Unitárias Optimização Técnico-Económica e Dimensionamento

Bibliografia

(*) → Biblioteca central

Operações unitárias

"Techniques de l'ingénieur"(*)

Destilação: J2 2610

Evaporação: J2 2320

Transporte P. A 5850

Filtração A 5500

Sedimentação A 5450

J. H. Perry, "Chem. Engineer's Handbook", McGraw-Hill

L. Almeida Alves, "Tecnologia Química – numa perspectiva de gastar dinheiro sem perder dinheiro", Fundação Calouste Gulbenkian, Lisboa, 1991.

S. M. Walas, "Chemical Process Equipment – Selection and Design", 1990

J. M. Coulson, J. F. Richardson, "Tecnologia Química", Fund. Calouste Gulbenkian, Lisboa, Vol I-VI.

C. J. Geankoplis, "Transport Processes and Unit Operations", 3rd Ed., Prentice Hall, 1993.

M.S. Peters and K.D. Timmerhaus, "Plant design and economics for chemical engineers." Mc. Graw-Hill, 4^a Ed., 1991.

R. Turton, R.C. Bailie, W.B. Whiting, J. A. Shaeiwitz, "Analysis, Synthesis, and Design of Chemical Processes", Prentice Hall, NJ, 1998.

C. Branan, "Rules of Thumb for Chemical Engineers, 3rd Ed. Gulf Professional Publishing, 2002.

L.T. Biegler, I.E. Grossmann, A.W. Westerberg, "Systematic Methods of Chemical Process Design", Prentice Hall, NJ, 1997.

"Encyclopedia of Chemical Processing and Design", J.J. McKetta and W.A. Cunningham Ed., Marcel Dekker, Inc, NY, 1976.

W. L. McCabe, J. Smith, "Unit Operations of Chem. Engineering", McGraw-Hill, 1976

R. E. Treybal, "Chem Engineering Series. Mass-Transfer Operations", McGraw-Hill, 3 Ed., 1980.

E. Ludwig, "Applied Process Design for Chemical and Petrochemical Plants", vol 1-3, Gulf Publishing Company, Houston, 1964.

Reynaldo Gomide, S. Paulo, "Operações Unitárias", Vol 1: Operações com Sistemas de Sólidos Granulares, Vol. 3: Separações Mecânicas, 1980.

C. Brown, "Unit Operations", John Wiley Sons, Inc., N.Y.

Zenz F. A. "Fluid-Particle systems", Reinhold publishing corporation, N.Y. 1960

A. Foust, "Principles of Unit Operation", John Wiley Sons, Inc., N.Y.

J.D. Seader, E.J. Henley, "Separation Process Principles", Wiley, NY, 1998.

Avaliação económica

M.S. Peters and K.D. Timmerhaus, "Plant design and economics for chemical engineers." Mc. Graw-Hill, 4^a Ed., 1991.

R. Turton, R.C. Bailie, W.B. Whiting, J. A. Shaeiwitz, "Analysis, Synthesis, and Design of Chemical Processes", Prentice Hall, NJ, 1998.

J. M. Coulson, J. F. Richardson, "Tecnologia Química", Fund. Calouste Gulbenkian, Lisboa, Vol VI.

"Techniques de l'ingénieur"(*)

F.A. Holland, F.A. Watson, J.K. Wilkinson, "Methods of Estimating Project Profitability", Chem. Eng., Oct 1, 1973, 80-84.

F.A. Holland, F.A. Watson, "Project Risk, Inflation and profitability", Chem. Eng., March 14, 1977, 133-136.

T.J. Ward, "Pre Design Estimating of Plant capital Costs", Chem. Eng., Sept 17, 1984, 121-124.

R.S. Hall, W.M. Vatavuc, J. Matley, "Estimating process Equipment Costs", Chem. Eng., Nov 21, 1988, 66-116.

R.S. Hall, J. Matley, J.M. Vaughton, "Current Cost of Process Equipment", Chem. Eng., Ap 5, 1982, 82-116.

G. D. Ulrich "How to calculate utility costs" Chem. Eng., Feb. 1992, 110-113

W.M. Vatavuc, "A Potpourri of Equipment Prices, Chem. Eng., Aug. 1995, 68-76.

F. C. Jelen, J. H. Black, "Cost and Optimization Engineering", McGraw-Hill, 2nd Ed., 1985.

J. M. Coulson, J. F. Richardson, "Tecnologia Química", Fund. Calouste Gulbenkian, Lisboa, Vol VI.

Propriedades de transporte e termodinâmicas

R.C.Reid, J.M.Prausnitz, T.K. Sherwood, "The properties of gases and liquids", McGraw-Hill

International Critical Tables(*)

ESDU International plc --- Engineering Data(*)

"Handbook of Chem. and Physics", The Chemical Rubber Co., 52nd Ed.,1971-72

J. H. Perry, "Chem. Engineer's Handbook", 6th Ed., McGraw-Hill

"Vapor-Liquid Equilibrium Data", Collection, Chemistry Data Series, Dechema.

J. R. Van Wazer, J. W. Lyons, K. Y. Kim, R. E. Colwell "Viscosity and Flow Measurement", Interscience Publishers, John Wiley Sons, N. Y., 1963

F. R. Eirich "Rheology: Theory and Applications", Academic Press Inc., Publishers, N. Y. 1958, Vol II.

Seleção de Materiais de construção

J. H. Perry, "Chem. Engineer's Handbook", 6th Ed.,McGraw-Hill

A, "Materials of Construction: Current Literature", Chem. Eng., Oct 29, 1984, 83-103

J.A. Rolston, "When and How to select Plastics", Chem. Eng., Oct 29, 1984, 70-75.

Consulta a fornecedores

Guia Mor

Páginas Amarelas

Internet

Operações unitárias específicas

Destilação

R. Darton, "Distillation and Absorption in 1987", Chem. Eng., Nov 1987, 36.

B. Sigales, "How to design Reflux Drums", Chem. Eng., March 3, 1975, 157-160.

J.H. Weber, "Predict Parameters of Correlations for Liquid Phase Composition" Chem. Eng., July 21, 1986, 57-62.

F-M. Tsuo, C.L. Yaws, J.S. Cheng, "Minimum Reflux for Sidestream Columns", Chem. Eng., July 21, 1986, 49-53.

T.K. Sherwood, G.H. Shipley, F.A.L. Holloway, "Flooding Velocities in Packed Columns", Ind. Eng. Chem., Vol 30, n° 7, 765-769.

N.H. Chen, "Equations for Flooding Rate in Packed Towers", Ind. Eng. Chem., Jan 1961, 6

T.J. Hixson, "Packed Column Design on a Pocket Calculator", Chem. Eng., Feb 6, 1984, 95-98.

R.D. Hunting, J.W. Robinson, "Predict Composition of Binary Mixtures", Chem. Eng., July 9, 1984, 91-96.

G.K. Chen, "Packed Column Internals", Chem. Eng., March 5, 1984, 40-51.

T.M. Fadel, "Selecting Packed-Column Auxiliaries", Chem. Eng., Jan 23, 1984, 71-76.

J.S. Miller, W.A. Kapella, "Installed Cost of a Distillation Column", Chem. Eng., April 11, 1977, 129-130.

"Flooding Velocities in Packed Columns Operating at Reduced Pressures", Chem. Eng Sci., 1957, Vol 6, 138-140

U.M. Diwekar, K.P. Madhavan, R.E. Swaney, "Optimization of Multicomponent Batch Distillation Columns", Ind. Eng. Chem. Res. 1989, 28, 1011-1017.

Ralph F. " Random packing and packed towers (design and applications)" Gulf Publishing company (1988)

Catálogos de Enchimento Sultzer

Transporte pneumático

J. Fisher, "Practical Pneumatic Conveyor Design", Chem. Eng., June 2, 1958, 114-118.

"Improved equation for the calculation of minimum fluidization velocity", Ind. Eng. Chem. Proc. Dev. 1986, 25

F.J. Gerchow, "How to Select a Pneumatic - Conveying System", Chem. Eng., Feb 17, 1975, 72-86.

M. Krauss, "Pneumatic Conveying Systems", Chem. Eng., Oct 13, 1986, 56.

- S. Constantinescu, "Sizing Gas Cyclones", Chem. Eng., Feb 20, 1984, 97-98.
- R.L. Carr Jr., "Evaluating Flow Properties of Solids", Chem. Eng., Jan 18, 1965, 163-168.
- F.M. Thomson, "Smoothing the Flow of Materials Through the Plant: Feeders", Chem. Eng., Oct 30, 1978, 77-87.
- F.J. Gerchow, "Specifying Components of Pneumatic - Conveying Systems", Chem. Eng., March 31, 1975, 88-96.
- A. Zanker, "Determining Air Inlet - Velocity for Cyclones", Chem. Eng., March 19, 1984, 159-160.
- D.J. Zigrang, N.D. Sylvester, "Equations for orifice - Meter Sizing", Chem. Eng., Feb 4, 1985, 91.
- L. Enliang, W. yingmin, "A New Collection Theory of Cyclone Separators", AIChE Journal vol. 35, n°4, April 1989, 666-669.
- J.Y. Day, H. Littman, M.H. Morgan, "A New Choking Velocity Correlation for Vertical Pneumatic Conveying", Chem. Eng. Sci., 145, N°1, 1990, 355-360.
- D. Mills, "Pneumatic conveying cost-effective design", Chem. Eng., Vol. 2, Feb. 1990, 70-82.
- F. O'Neill "Trouble shooting, pneumatic conveying", Chem. Eng., vol 6, June, 1990, 93.
- D. Mills, "Trouble shooting , pneumatic conveying", Chem. Eng., vol 7, July, 1990, 101-107.
- A. Lucas, J. Arnaldos, J. Casal, L. Puigjaner, "Improved equation for the calculation of Minimum Fluidization Velocity", Ind. Eng. Chem. Process. Des. Dev., 15, 1986, 426-429.

Filtração

- P. Nield, The Chem Engineer, Nov 1988, 45-48.
- L. Cook, "Laboratory Approach Optimizes Filter-Aid Addition", Chem. Eng July 23, 1984, 45-50.
- D. W. Cheape Jr., "Leaf Tests Can Establish Optimum Rotary-Vacuum-Filter Operation", Chem. Eng, June 14, 1982, 141-148
- D.N. Moir, "Selecting batch pressure filters, Chem. Eng., 89(15), 1982, 47-57.
- T.R. Brown, Designing batch pressure filters, Chem. Eng., 89(15), 1982, 58-63.

Torre de Refrigeração

Geankopolis C. J., *Transport Processes and Unit Operations*, PTR Prentice-Hall, Inc, 1978, 3^a Ed.

Coulson J.M., Richardson, J.F. *Tecnologia Química*, Vol I, Fundação Calouste Gulbenkian.

R. E. Treybal, "Chem Engineering Series. Mass-Transfer Operations", McGraw-Hill, 3 Ed., 1980.

Ludwig, E. E., *Applied Process Design for Chemical and Petrochemical Plants*, vol. 2, pp.219 ss., Gulf Publish. Comp., 1977.

Tanque com agitação

Aeration - A Wastewater Treatment Process, Water Environment Federation & American Society of Civil Engineers, New York 2001 (Biblioteca Química).

Alves, S.S. e J.M.T.Vasconcelos, *Optimisation of agitation and aeration in fermenters*, Bioprocess Eng. 14, 119-123 (1996) (Biblioteca Biotecnologia).

Coulson J.M. e J.F.Richardson, *Tecnologia Química*, Vol.II, 2^a ed, cap.18, Fund. Gulbenkian (1968).

Eckenfelder, W.W., J.Patoczka e A.T. Watkin, *Wastewater Treatment*, Chem. Eng. Sept. 2, 60-74 (1985).

Geankoplis, C.J., *Transport Processes and Unit Operations*, 3nd ed., cap.3, Prentice Hall (1993).

McCabe, W.L., J.C.Smith e P.Harriott, *Unit Operations of Chemical Engineering*, 4th ed., cap.9, McGraw-Hill (1985).

Mc Ghee, *Water Supply and Sewage*, 6th ed., cap.s 18 e 22, McGraw-Hill (Biblioteca Química).

Peters, M.S. e K.D. Timmerhaus, *Plant Design and Economics for Chemical Engineers*, 4th ed., McGraw-Hill, 1991.

Qasim, S.R., *Wastewater Treatment Plants – Planning, Design, and Operation*, 2nd ed., cap. 13, Technomic Publishing Co., Lancaster (USA) (1999) (Biblioteca Química).

Rushton, J.H., Costich, E.W. e Everett, H.J., *Power Characteristics of Mixing Impellers Part I*, Chem. Eng. Progr., 46 (8), 395-404 (1950).

Smith, J.M., *Simple Performance Correlations for Agitated Vessels*, Proceedings of the 7th European Conference on Mixing, vol. I, pp. 233-241, Royal Flemish Society of Engineers, Brugge (Belgium) (1991) (docente).

Turton R. et al, *Analysis, Synthesis and Design of Chemical Processes*, cap.9 (Tabelas Informativas sobre Dimensionamento), Prentice Hall, 1998 (Biblioteca Química).

Wilson, F., *Design Calculations in Wastewater Treatment*, cap. 4, E.& F.N. Spon, London (1981) (Biblioteca Química).

Coluna de bolhas

Aeration - A Wastewater Treatment Process, Water Environment Federation & American Society of Civil Engineers, New York 2001 (Biblioteca Química).

Deckwer, W.-D. e A. Schumpe, *Improved Tools for Bubble Column Reactor Design and Scale-up*, Chem.Eng.Sci. 48 (5), 889-911 (1993);

Eckenfelder, W.W., J.Patoczka e A.T. Watkin, *Wastewater Treatment*, Chem. Eng. Sept. 2, 60-74 (1985).

- Heijnen, J.J. e K. van't Riet, *Mass Transfer, Mixing and Heat Transfer Phenomena in Low Viscosity Bubble Column Reactors*, Chem. Eng. J., 28, B21-B42 (1984);
Mc Ghee, *Water Supply and Sewage*, 6th ed., cap.s 18 e 22, McGraw-Hill (Biblioteca Química).
Peters, M.S. e K.D. Timmerhaus, *Plant Design and Economics for Chemical Engineers*, 4th ed., McGraw-Hill, 1991.
Treybal, R.E., *Mass transfer Operations 3rd Ed.*, cap. 6, McGraw-Hill, New York (1980).
Turton R. et al, *Analysis, Synthesis and Design of Chemical Processes*, cap.9 (Tabelas Informativas sobre Dimensionamento), Prentice Hall, 1998 (Biblioteca Química).
Wilson, F., *Design Calculations in Wastewater Treatment*, cap. 4, E.& F.N. Spon, London (1981) (Biblioteca Química).
Zlokarnik, M., *Tower-Shaped Reactors for Aerobic Biological Waste Water Treatment*, Biotechnology vol. 2, cap 23, H.-J. Rehm e G. Reed eds., VCH, Weinheim (1985) (docente).

Conduta

B.D. Smith, "Sizing the Economic Pipe", Chem. Eng., Sept 1989, 201-204.

I.P. Kohli, "Steam tracing of pipelines", Chem. Eng., Mar. 26, 1979, 156-163.

F. Bondi, J. Mesagno, M. Schwartz, "An easy way to design steam tracing for pipelines", Chem. Eng., Aug.. 4, 1986, 65-70.

Sedimentação

Ir. L. Huisman, "Sedimentation and Flotation Mechanical Filtration", Delft Univ. of Technology, 1981.

M.J. Pearse, "Gravity Thickening Theories: A review Warren Spring Lab., UK, 1977.

"A Modification of The Kynch theory of Sedimentation", AIChE Journal, Feb 1987, vol 33, n°2

J. A. Seifert, "Selecting thickners and clarifiers.", Chem. Eng., Oct. 12, 1987, 111-118.

E. Barnea, "New plot enhances value of batch-thickning test.", Chem. Eng., Aug.29,1977, 75-78.

Evaporador

R.N. Lambert, D.D. joye, F.W. Koko, "Design Calculations for Multiple-Effect Evaporate -1 Linear Method", Ind. Eng. chem Res., 1987, 26, 100-104.

W.M. Wagner, D.R. Finnegan, "select a Seawarwe-Desalting Process, chem. eng., 7, 1983, 71-75.

B. Yundt, "Troubleshooting VC evaporators, Chem. Eng., 24, 1984, 46-55.

C.G. Lower, "Heat-Transfer Coefficient Depends on Tubeside Flowrate, Chem. Eng., 9, 1984, 101-103.

M.I.A.A. Durand, a shortcut For Designing Evaporators, Chem. Eng. 1996, 103, 123-124.