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Isotherm, Inc.
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Arlington, Texas 76001

EDUCATION:

Ph.D., Mechanical Engineering, Iowa State University, U.S.A., 1986.
MS, Nuclear Engineering, University of London, U.K., 1979.
DQMC, Nuclear Reactor Science, Queen Mary College, London, U.K., 1979.
BS, Mechanical Engineering, University of Peshawar, 1977, Pakistan.

EXPERIENCE:

1999 - present

President of Isotherm, Inc., a manufacturer of Heat Transfer Equipment.
Arlington, Texas

1998 - 1997

VP/GM at ThermoFluid International, Inc., a Tranter/Dover company.
Arlington, Texas

1991 – 1997

Founder and President of Ayub & Associates, Inc. d.b.a. ThermoFluid International.
Arlington, Texas

1990 – 1991

Manager Refrigeration Products at Ketema.
Grand Prairie, Texas

1986 – 1990

Chief Engineer at E. L. Nickell Company
Constantine, Michigan

1979 – 1980

Assistant Engineer at Pakistan Atomic Energy Commission
PINSTECH, Nilore, Islamabad

HONORS & AWARDS:

Recipient of Presidential Award.

Recipient of Michigan New Product Award for Falling Film Chiller.

Listed in the Who's Who.

Fellow of ASME.

ASHRAE Distinguished Service Award.

Member Scientific Council, representing USA - International Center for Heat and Mass Transfer.

REGISTRATION:

Registered Professional Engineer in the States of Michigan and Texas

MEMBERSHIP:

ASME, ASHRAE, IIR, IoR (UK), Sigma Xi Honor Research Society.

Reviewer to several Heat Transfer Journals.

Past Technology Editor, International Journal of Enhanced Heat Transfer.

Executive Editor, Technology Development, Journal of Heat Transfer Engineering.

PUBLICATIONS:

Ayub, Z. H. and Chyu, M-C., "Limited Charge Shell & Tube Ammonia Spray Evaporator with Enhanced Tubes for a Thermal Storage System", presented for IIR Conference.

Ayub, Z. H., "Temperature Gradient along the Circumference of an Electrically Heated Tube in a Pool of Saturated Water", presented for journal publication.

Ayub, Z. H., "A New Chart Method for Evaluating Single Phase Shell Side Heat Transfer Coefficient in a Shell and Tube Heat Exchanger", presented for journal publication.

Ayub, Z. H. and Chyu, M-C., "Case Study of Ammonia Flooded Evaporator with Different Types of Carbon Steel Enhanced Tubes along the Bundle Height", Proceedings of the 6th Gustav Lorentzen Natural Working Fluids Conference, Glasgow, UK, 2004.

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Ayub, Z. H., "Industrial Refrigeration and Ammonia Enhanced Heat Transfer", Proceedings of the ASME-ZSIS International Thermal Science Seminar II (CD-ROM), Slovenia, June, 2004, pp. 13-23.

Ayub, Z. H., "Are we on the right track?," Heat Transfer Engineering, Vol. 24, No. 5, 2003, pp. 1-2.

Ayub, Z. H., "Plate Heat Exchanger Literature Survey and New Heat Transfer and Pressure Drop Correlations for Refrigerant Evaporators," Heat Transfer Engineering, Vol. 24, No. 5, 2003, pp. 3-16.

Zeng, X., Chyu, M.-C., and Ayub, Z. H., "Experimental Investigation on Ammonia Spray Evaporator with Triangular-Pitch Bundle, Part II: Evaporator Performance," International Journal of Heat and Mass Transfer, Vol. 44/12, 2001, pp. 2299-2310.

Zeng, X., Chyu, M.-C., and Ayub, Z. H., "Experimental Investigation on Ammonia Spray Evaporator with Triangular-Pitch Bundle, Part I: Tube Bundle Effect," International Journal of Heat and Mass Transfer, Vol. 44/11, 2001, pp. 2081-2092.

Zheng, J. X., Jin, G. P., Chyu, M.-C., and Ayub, Z. H., "Flooded Boiling of Ammonia with Miscible Oil Outside a Horizontal Plain Tube", *International Journal of Heating, Ventilating, Air-Conditioning and Refrigerating Research*, Vol. 7, No. 2, 2001, pp. 185-204.

Zeng, X., Chyu, M.-C., and Ayub, Z. H., "An Experimental Study of Spray Evaporation of Ammonia in a Square-Pitch, Low-Fin Tube Bundle," *Proceedings of the 34th National Heat Transfer Conference (CD_ROM)*, Pittsburg, PA, August, 2000, Paper NHTC-2000-12215.

Zeng, X., Chyu, M.-C., and Ayub, Z. H., "Ammonia Spray Evaporation Heat Transfer Performance of Single Low-Fin and Corrugated Tubes," *Proceedings of the ASME-ZSITS International Thermal Science Seminar (CD-ROM)*, Slovenia, June, 2000, pp. 325-332.

Zeng, X., Chyu, M.-C., and Ayub, Z. H., "Evaporation Heat Transfer Performance of Nozzle-Sprayed Ammonia on a Horizontal Tube," *Proceedings of the ASME-ZSITS International Thermal Science Seminar (CD-ROM)*, Slovenia, June, 2000, pp. 317-324.

Ayub, Z., "Case Study: Practical Application of Enhancement Device in an Ammonia Flooded Evaporator," *Journal of Enhanced Heat Transfer*, Vol. 6, No. 1, 1999, pp. 31-35.

Zeng, X., Chyu, M.-C., and Ayub, Z. H., "Ammonia Spray Evaporation Heat Transfer Performance of Single Low-Fin and Corrugated Tubes," *ASHRAE Transactions*, 1998, Vol. 104, pt. 1, pp. 185-196.

Zeng, X., Chyu, M.-C., and Ayub, Z. H., "Performance of Nozzle-Sprayed Ammonia Evaporator with Square Pitch Plain Tube Bundle," *ASHRAE Transactions*, 1997, Vol. 103, pt. 2, pp. 68-81.

Ayub, Z. H., "Material Selection Criterion for Ammonia Refrigeration Equipment Operating at Temperatures below -20 °F," *Proceedings of the 19th International Institute of Ammonia Refrigeration*, New Orleans, 1997, pp. 33-48.

Ayub, Z. H. and Chyu, M.-C., "Application of Passive Enhancement to a 400 Ton Propylene Glycol/Ammonia Spray Evaporator," *Process Enhanced and Multi-Phase Heat Transfer*, Begell House, Inc., New York, 1996, pp. 333-338.

Ayub, Z. H., Chyu, M.-C., and Zeng, X., "The Design and Operational Characteristics of Ammonia Spray Evaporators," *Proceedings of the 18th International Institute of Ammonia Refrigeration*, Atlanta, 1996, pp. 315-363.

Zeng, X., Chyu, M.-C., and Ayub, Z. H., "Nozzle-Sprayed Flow Rate Distribution on a Horizontal Tube Bundle," *ASHRAE Transactions*, 1995, Vol. 101, pt. 2, pp. 443-353.

Zeng, X., Chyu, M.-C., and Ayub, Z. H., "Evaporation Heat Transfer Performance of Nozzle-Sprayed Ammonia on a Horizontal Tube," ASHRAE Transactions, 1995, Vol. 101, pt. 1, pp. 136-149.

Zeng, X., Chyu, M.-C., and Ayub, Z. H., "Characteristic Study of Sprayed Fluid Flow in a Tube Bundle," ASHRAE Transactions, 1994, Vol. 100, pt. 1, pp. 63-72.

Rudy, T., Ayub, Z. H., and Webb, R. L., "Technology Review," Journal of Enhanced Heat Transfer, Vol. 2, No. 2, 1994, pp. 127-130.

Ayub, Z. H. and Al-Fahed, S. F., "The Effect of Gap Width between Horizontal Tube and Twisted Tape on the Pressure Drop in Turbulent Water Flow," International Journal of Heat and Fluid Flow, Vol. 14, No. 1, 1993, pp. 64-67.

Al-Fahed, S. F., Ayub, Z. H., Al-Marafie, A. M., and Soliman, B. M., "Heat Transfer and Pressure Drop in a Tube with Internal Microfins under Turbulent Water Flow Condition," Experimental Thermal and Fluid Science, 1993, Vol. 7, pp. 249-253.

Fujii, M., Menze, K., Rudy, T., and Ayub, Z. H., "Technology Review," Journal of Enhanced Heat Transfer, Vol. 1, No. 1, 1993, pp. 1-4.

Ayub, Z. H., "Thermal Storage Vertical Falling Film Shell-and-Tube Ammonia Evaporator," Proceedings of the 14th International Institute of Ammonia Refrigeration, Miami, 1992, pp. 285-302.

Cho, C. S. K., Hwang, Q. N., Reddy, R. K., and Ayub, Z. H., "Enhanced Nucleate Boiling in Structured Surfaces," I-Therm 92, Austin, Texas, 1992, pp. 1-6.

Pate, M. B., Ayub, Z. H., and Kohler, J., "Heat Exchangers for Air-Conditioning and Refrigeration Industry," Heat Transfer Engineering, Vol. 12, No. 3, 1991, pp. 56-70.

Ayub, Z. H. and Knewitz, S. K., "Limited Inventory Ammonia Falling Film Spray Evaporators," Proceedings of the 13th International Institute of Ammonia Refrigeration, San Francisco, 1991, pp. 61-78.

Ayub, Z. H., "Shell-Side Two-Phase Heat Transfer Coefficient for Coils in R-22 and Ammonia," ASHRAE Transactions, 1991, Vol. 97, pt. 1, pp. 1-2.

Cho, C. S. K., Turner, N., and Ayub, Z. H., "Nucleate Pool Boiling on Structured and Plain Surfaces," Proceedings of the 6th Miami International Symposium on Heat and Mass Transfer, Miami, 1990, pp. 1-17.

Ayub, Z. H., "Effect of Flow Maldistribution on Partial Condenser Performance," Chemical Processing, Vol. 53, No. 10, 1990, pp. 30-38.

Pate, M. B., Ayub, Z. H., and Kohler, J., "Heat Exchangers for Air-Conditioning and Refrigeration Industry: State-of-the-Art Design and Technology," Compact Heat Exchangers, Hemisphere Publishing Corp., New York, 1990, pp. 567-590.

Ayub, Z. H. and Bergles, A. E., "Nucleate Pool Boiling Curve Hysteresis for GEWA-T Surfaces in Saturated R-113," International Journal of Experimental Thermal and Fluid Science, Vol. 3, No. 2, 1990, pp. 249-255.

Ayub, Z. H., "Establishing Tube-Side Flow Rate in a Shell-and-Tube Flooded Evaporator," Engineered Systems, Vol. 7, No. 1, 1990, pp. 37-38.

Ayub, Z. H., "Application of Enhanced Heat Transfer Surfaces," Proceedings of the 11th International Institute of Ammonia Refrigeration, Austin, 1989, pp. 319-340.

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Ayub, Z. H. and Cole, R. A., "A Case Study of Flow Maldistribution in Isobutyraldehyde Partial Condenser," Maldistribution of Flow and Its Effects on Heat Exchanger Performance, HTD-Vol. 75, ASME, 1987, pp. 91-96.

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Ayub, Z. H., "Third World and the transfer of Nuclear Technology," Proceedings of the 7th Third World Studies Conference, Lincoln, Nebraska, 1984.

Ayub, Z. H., "Pakistan's Energy Needs and its Nuclear Program," Proceedings of the 12th Annual Conference on South Asia, Madison, Wisconsin, 1983.

Ayub, Z. H. and Rahman, I. U., "Supplementing Energy Sector by Renewable Energy Source," Proceedings of the 1st National Energy Conference, Islamabad, Pakistan, 1980.

TECHNICAL REPORTS AND DISSERTATIONS:

Ayub, Z. H., "Pool Boiling from GEWA Surfaces in Water and R-113," Ph. D. Dissertation, Iowa State University, 1986, pp. 1-148.

Bergles, A. E. and Ayub, Z. H., "Nucleate Boiling Characteristics of Inconel Tubing," Technical Report prepared for Babcock-Wilcox, 1984, pp. 1-33.

Ayub, Z. H., "Experimental Study of the temperature and Flow Distribution above the Core of the University of London Reactor," MSc. Dissertation, University of London, 1979, pp. 1-127.

Ayub, Z. H., "The Potential Role of Nuclear Power in Pakistan and the Prospects of Selecting a Suitable Site for Nuclear Power Plant in N.W.F.P.," BS Dissertation, University of Peshawar, 1977, pp. 1-216.

PATENTS:

Ayub, Z. H., "Heat Exchanger," United States Patent 4,805,694.

Ayub, Z. H., "Vertical Falling Film Multi-Tube Heat Exchanger," United States Patent 4,932,468.

Ayub, Z. H., "Distributor for Plate Exchangers," United States Patent 6,179,051.

PATENTS APPLIED FOR

Ayub, Z. H., "Flooded Evaporator with Various Kinds of Tubes".

Ayub, Z. H., "Compressor Oil Removal in Ammonia Refrigeration System".

Ayub, Z. H., "End Bonnets for Shell and Tube DX Evaporator".

Ayub, Z. H., "DX Evaporator with Various Size Tubes".

SEMINARS AND ORAL PRESENTATIONS:

Low Charge Ammonia Evaporators, ASHRAE East Texas Chapter, May 2003.

Shell and Tube Ammonia DX Evaporator Performance: Case Study, ASHRAE 1997.

Low Charge Ammonia Evaporators for Industrial Refrigeration Applications, RETA Chicago Chapter, 1997.

Enhancement and Low Charge Evaporators, Center for Nuclear Studies, Pakistan, 1997.

Reduced Refrigerant Charge Evaporators, Rensselaer Polytechnic Institute, 1995.

Low Refrigerant (Ammonia) Charge Evaporators (Spray Type), Weiland-Werke, Germany, 1995.

Heat Exchangers in Europe and USA, ASHRAE, 1993.

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Latest Developments in the Heat Exchanger Design and Fabrication Technology, Iowa State University, 1989.