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Heat Transfer in Counterflow, Parallel-flow, and Cross-flow Fluid-Structure Interactions Thermal Performance Modeling of Cross-Flow Heat Exchangers Fluid-Structure Interactions Influence of Cross Flow on Two Dimensional Separation Design and Operation of Heat Exchangers Prediction of Thermal Performance of Cross Flow Heat Exchangers Thermal Performance Modeling of Cross-Flow Heat Exchangers The Mode-selection Mechanism of Cross-flow Instability in Three-dimensional Boundary Layers FSI/FIV in Cylinder Arrays in Cross-flow Drying Effects of Cross-flow Air Circulation on Wheat Stored in Deep Cylindrical Bins Transient Performance of Parallel-flow and Cross-flow Direct Transfer Type Heat Exchangers with a Step Temperature Change on the Minimum Capacity Rate Fluid Stream Handbook for Heat Exchangers and Tube Banks design Cross-flow Filtration in Physical-chemical Treatment of Municipal Sewage Effluents Membranes for Food Applications Flow Field Measurements for a Cross Flow Turbine Hyperfiltration and Cross-flow Filtration of Kraft Pulp Mill and Bleach Plant Wastes Effect of Transverse Oscillations Upon the Local Convective Heat Transfer Coefficient for Circular Cylinder with Cross-flow On the Nonlinear Evolution of a Stationary Cross-flow Vortex in a Fully Three-dimensional Boundary Layer Flow Transpiration Cooling of a Cylinder in Cross Flow with Helium Injection Delta Wings with Shock-free Cross Flow Interaction of Multiple Bodies in a Free Surface with Consideration of Cross Flow Use Of Flow Patterns In Predicting Shell-Side Heat Transfer Coefficients For Baffled Shell-And-Tube Heat Exchangers Gas Turbine Plant Heat Exchangers Heat Exchangers Bluff-Body Wakes, Dynamics and Instabilities Interaction region phenomena for the jet in a cross-flow problem Cross-flow Induced Vibration of Cylinder Arrays Manipulation and Control of Jets in Crossflow Pressure Drop and Liquid Distribution in a Cross-flow Packed Scrubber Measurement of the temperature and flow fields of the magnetically stabilized cross-flow N#1tn2 arc Improvement of a Cross Flow Heat Exchanger Test Bench Practical Heat Transfer of Finned Tube Bundles in Crossflow Flow-sound Interaction Mechanism of a Single Spirally Finned Cylinder in Cross-flow NASA Technical Paper Compact Heat Exchangers Shock Tunnel Studies on Lateral Jets, Hypervelocity Cross Flow Interaction Cross Flow and Pool Boiling of Ethanol-water Mixtures on the Outside of Horizontal Smooth and Enhanced Tubes Negatively Buoyant Jets in a Cross Flow Cross-flow Induced Vibration of Cylinder Arrays

NASA Technical Paper Jan 30 2020

Effect of Transverse Oscillations Upon the Local Convective Heat Transfer Coefficient for Circular Cylinder with Cross-flow Jul 18 2021

Fluid-Structure Interactions Dec 03 2022 Structures in contact with fluid flow, whether natural or man-made, are inevitably subject to flow-induced forces and flow-induced vibration: from plant leaves to traffic signs and to more substantial structures, such as bridge decks and heat exchanger tubes. Under certain conditions the vibration may be self-excited, and it is usually referred to as an instability. These instabilities and, more specifically, the conditions under which they arise are of great importance to designers and operators of the systems concerned because of the significant potential to cause damage in the short term. Such flow-induced instabilities are the subject of this book. In particular, the flow-induced instabilities treated in this book are associated with cross-flow, that is, flow normal to the long axis of the structure. The book treats a specific set of problems that are fundamentally and technologically important: galloping, vortex-

shedding oscillations under lock-in conditions and rain-and-wind-induced vibrations, among others.

Transient Performance of Parallel-flow and Cross-flow Direct Transfer Type Heat Exchangers with a Step Temperature Change on the Minimum Capacity Rate Fluid Stream Jan 24 2022 "Parallel and cross-flow with both fluids unmixed, direct transfer type heat exchangers are modeled utilizing a thermal network consisting of nodes and resistors. A commercially available software package, Thermonet, calculates the transient outlet temperatures for a steadystate model introduced to a sudden change (step input) in inlet temperature of the Cmin fluid stream. Both models are validated against analytical solutions provided in literature. Solutions are verified to within a maximum percent mean difference of 4 % of analytical solutions for parallel-flow, and 8 % of analytical solutions for cross-flow heat exchangers. Tables are generated which provide new dimensionless transient outlet temperature effectiveness values for parallel and cross-flow with both fluids unmixed, heat exchangers. The parallel-flow temperature responses are presented in graphical form for the specific parameters: NTU equal to 0.5, 1.0, and 3.0; C* equal to 0.2, 0.6, and 1.0; R* equal to 0.5, 1.0, and 2.0; Cw* equal to 1.0, 10.0, and 1000.0; and td equal to 0.25, 1.0, and 4.0. The cross-flow temperature responses are presented in graphical form for the same parameters listed above except NTU is equal to 1.0. Discussion regarding the dimensionless parameters' effects on the transient response of the heat exchanger is provided. The transient performance tables provide a quick reference for transient outlet temperature solutions required for practical industrial heat exchanger analysis."--Abstract.

Drying Effects of Cross-flow Air Circulation on Wheat Stored in Deep Cylindrical Bins Feb 22 2022

Measurement of the temperature and flow fields of the magnetically stabilized cross-flow N#1tn2 arc Jun 04 2020

Fluid-Structure Interactions Oct 01 2022 Structures in contact with fluid flow, whether natural or man-made, are inevitably subject to flow-induced forces and flow-induced vibration: from plant leaves to traffic signs and to more substantial structures, such as bridge decks and heat exchanger tubes. Under certain conditions the vibration may be self-excited, and it is usually referred to as an instability. These instabilities and, more specifically, the conditions under which they arise are of great importance to designers and operators of the systems concerned because of the significant potential to cause damage in the short term. Such flow-induced instabilities are the subject of this book. In particular, the flow-induced instabilities treated in this book are associated with cross-flow, that is, flow normal to the long axis of the structure. The book treats a specific set of problems that are fundamentally and technologically important: galloping, vortex-shedding oscillations under lock-in conditions, and rain-and-wind-induced vibrations, among others. The emphasis throughout is on providing a physical description of the phenomena that is as clear and up-to-date as possible.

FSI/FIV in Cylinder Arrays in Cross-flow Mar 26 2022

Transpiration Cooling of a Cylinder in Cross Flow with Helium Injection May 16 2021

Interaction region phenomena for the jet in a cross-flow problem Oct 09 2020

Gas Turbine Plant Heat Exchangers Jan 12 2021

On the Nonlinear Evolution of a Stationary Cross-flow Vortex in a Fully Three-dimensional Boundary Layer Flow Jun 16 2021

Improvement of a Cross Flow Heat Exchanger Test Bench Practical May 04 2020 Final year report -- Meganiese Ingenieurswese.

Cross-flow Filtration in Physical-chemical Treatment of Municipal Sewage Effluents Nov 21 2021

Heat Exchangers Dec 11 2020 This is a text/reference illustrating thermal and hydraulic design of heat exchangers. The book shows how to apply the fundamentals

of thermodynamics, heat transfer, and fluid dynamics for a systematic analysis of the phenomena in heat exchangers, important to energy effective operation in process plants. Beginning with illustrative examples detailing applications of fundamentals, the text then shows the influence of flow configuration on the performance of heat exchangers. Here the equations to calculate mean temperature difference and efficiency for stirred tank, parallel, counter-and cross flow and their combinations are derived and put together in a new and very compact way. In some cases, short computer programs are given to evaluate more complicated formulas or algorithms. Chapter 3 is comprised of seven fully worked out examples showing application of the fundamentals to thermal and hydraulic design, i.e. sizing of heat exchangers. It includes problems and worked examples and is written in a self study format. The text should be useful to practicing engineers and also graduate students in chemical and mechanical engineering.

Delta Wings with Shock-free Cross Flow Apr 14 2021

Handbook for Heat Exchangers and Tube Banks design Dec 23 2021 The motion of fluids is never in parallel- or counter-flow in heat exchangers and tube banks, leading to complexities in the equations for calculating their transferred heat and temperatures. This review of the topic includes 70 design and verification tables.

Prediction of Thermal Performance of Cross Flow Heat Exchangers Jun 28 2022

Influence of Cross Flow on Two Dimensional Separation Aug 31 2022 The report is a review of some of the problems associated with the design of a rotating axi-symmetric body to study the effect of cross flow on two dimensional separation. A hollow cylinder flare model with 8 in. diameter was designed to rotate up to 5,000 r.p.m. in the 16 in. x 16 in. test section of the VKI continuous supersonic wind tunnel S-1 at a free stream Mach number of 2.25. Problems related to the static pressure measuring equipment, the optimum model configuration, the model driving mechanism and the model vibrations are discussed. (Author).

Negatively Buoyant Jets in a Cross Flow Sep 27 2019 "Negatively buoyant jets, or sinking jets, can be observed in many problems of pollutant discharge. Any chemical waste that is heavier than the receiving water into which it is discharged may act as a negatively buoyant jet. In addition, when water is taken from the hypolimnion of a deep lake or reservoir and used as cooling water, the temperature, and consequently, the discharge may behave like a negatively buoyant jet. Two existing jet diffusion models have been utilized to predict the trajectory and dilution of a positively buoyant jet, or a rising jet, and have been modified to account for the sinking effect. Twenty-four experimental investigations were conducted involving different combinations of densimetric Froude number, velocity ratios, and initial angle of discharge. Salt was used as the tracer, yielding a fluid that was denser than the ambient receiving water and facilitated measuring concentration profiles of the jet plume. The coefficient of entrainment, the major mechanism of dilution, was determined as a function of the densimetric Froude number, velocity ratio, and initial angle of discharge. The reducted drag coefficient was chosen as zero for both models since any other value would predict a trajectory whose rise would be less than experimentally observed. For all angles of discharge the entrainment coefficient increased with a decrease in the velocity ratio and with an increase in densimetric Froude number. Additionally, there was a marked decrease in the entrainmnet coefficient with a decrease in the initial angle of discharge."--Page ii.

Thermal Performance Modeling of Cross-Flow Heat Exchangers Nov 02 2022 This monograph introduces a numerical computational methodology for thermal performance modeling of cross-flow heat exchangers, with applications in chemical, refrigeration and automobile industries. This methodology allows obtaining effectiveness-number of transfer units (e-NTU) data and has been used for simulating several standard and complex flow arrangements configurations of cross-flow heat exchangers. Simulated results have been validated through comparisons

with results from available exact and approximate analytical solutions. Very accurate results have been obtained over wide ranges of NTU and C* values in all cases. The proposed procedure constitutes a useful research tool for both theoretical and experimental studies of cross-flow heat exchangers. The following are the unique features of the book: - The monograph includes the computational code named HETE (Heat Exchanger Thermal Effectiveness) in Chapter 5. A version of this code is available for downloading. - The computational procedure could be used for reducing experimental data using the effectiveness - NTU (e-NTU) method in research and industrial laboratories. - Even after more than one century in heat exchanger research, the search for new flow arrangements with higher effectiveness still is an unsolved problem. The present methodology could be a useful tool in pursuing that goal.

Design and Operation of Heat Exchangers Jul 30 2022 The Eurotherm Committee was created in 1986 from member countries of the European Community. It has the purpose of organising and coordinating scientific events such as seminars and conferences in the thermal sciences. The series of Eurotherm Seminars established by the Committee has become a popular forum for high-level scientific and technical interchange of ideas in a wide range of specialist topics. While the presentation and publication of papers at the Seminars are encouraged, the primary aim is to stimulate discussion and liaison between specialist groups. The present Chairman of Eurotherm is Professor C.J. Hoogendoorn of the Technical University, Delft (Fax [NL] 15, 783251). Information on Mure Seminars is available from the Secretary, Keith Cornwell, Heriot-Watt University, Edinburgh (Fax [UK] 31, 451, 3129). This particular Seminar No. 18 on the Design and Operation of Heat Exchangers was the first one on this topic and was held at the Universitat der Bundeswehr Hamburg (University of the Federal Armed Forces Hamburg) from February 27 to March 1 in 1991. The seminar was an international event and was attended by more than 60 scientists not only from countries of the European Community such as Belgium, France, Germany, Great Britain, and the Netherlands but also from other countries such as Canada, China, India, Israel, Romania, Soviet Union, Sweden and the United States of America.

Interaction of Multiple Bodies in a Free Surface with Consideration of Cross Flow Mar 14 2021

Flow Field Measurements for a Cross Flow Turbine Sep 19 2021

Use Of Flow Patterns In Predicting Shell-Side Heat Transfer Coefficients For Baffled Shell-And-Tube Heat Exchangers Feb 10 2021

Cross Flow and Pool Boiling of Ethanol-water Mixtures on the Outside of Horizontal Smooth and Enhanced Tubes Oct 28 2019

Cross-flow Induced Vibration of Cylinder Arrays Aug 26 2019

Bluff-Body Wakes, Dynamics and Instabilities Nov 09 2020 Bluff-body wakes play an important role in many fluid dynamics problems and engineering applications. This book gives and up-to-date account of recent results obtained in the study of bluff-body wakes. Experimental, theoretical and numerical approaches are all comprehensively covered and compared. Topics of particular interest include hydrodynamic instability analyses, three-dimensional pattern formation problems, flow control methods, bifurcation analyses, numerical simulations and turbulence modelling. The main originality of thisvolume is that recent conceptual advances made to describe nonlinear phenomena in general are put to the test on a classical problem in fundamental fluid mechanics, namely the wake structure generated behind a bluff object.

The Mode-selection Mechanism of Cross-flow Instability in Three-dimensional Boundary Layers Apr 26 2022

Flow-sound Interaction Mechanism of a Single Spirally Finned Cylinder in Cross-flow Mar 02 2020 Over the years, some effort has been expended in the improvement of heat transfer performance in tubular heat exchangers. This can be achieved by

adding different types of fins to the outer tube surface, effectively increasing convective heat transfer. However, the addition of fins may lead to the generation of severe noise, caused by the coupling between the vortex shedding frequency and one of the acoustic cross-modes of the duct housing the finned tubes. This may reduce the service life of the heat exchangers, and adversely affect the health of individuals working in the proximity of such noise. Since the flow-acoustic phenomenon of finned tubes are not well understood, it can be dangerously unpredictable. Therefore in this thesis, the flow-sound interaction mechanism of a single spirally finned cylinder in cross-flow is investigated. Moreover, a simple noise control technique is proposed to suppress the onset of acoustic resonance excitation.

Heat Transfer in Counterflow, Parallel-flow, and Cross-flow Jan 04 2023

Shock Tunnel Studies on Lateral Jets, Hypervelocity Cross Flow Interaction Nov 29 2019

Cross-flow Induced Vibration of Cylinder Arrays Sep 07 2020

Compact Heat Exchangers Dec 31 2019 A comprehensive source of generalized design data for most widely used fin surfaces in CHEs Compact Heat Exchanger Analysis, Design and Optimization: FEM and CFD Approach brings new concepts of design data generation numerically (which is more cost effective than generic design data) and can be used by design and practicing engineers more effectively. The numerical methods/techniques are introduced for estimation of performance deteriorations like flow non-uniformity, temperature non-uniformity, and longitudinal heat conduction effects using FEM in CHE unit level and Colburn j factors and Fanning friction f factors data generation method for various types of CHE fins using CFD. In addition, worked examples for single and two-phase flow CHEs are provided and the complete qualification tests are given for CHEs use in aerospace applications. Chapters cover: Basic Heat Transfer; Compact Heat Exchangers; Fundamentals of Finite Element and Finite Volume Methods; Finite Element Analysis of Compact Heat Exchangers; Generation of Design Data by CFD Analysis; Thermal and Mechanical Design of Compact Heat Exchanger; and Manufacturing and Qualification Testing of Compact Heat Exchanger. Provides complete information about basic design of Compact Heat Exchangers Design and data generation is based on numerical techniques such as FEM and CFD methods rather than experimental or analytical ones Intricate design aspects included, covering complete cycle of design, manufacturing, and qualification of a Compact Heat Exchanger Appendices on basic essential fluid properties, metal characteristics, and derivation of Fourier series mathematical equation Compact Heat Exchanger Analysis, Design and Optimization: FEM and CFD Approach is ideal for senior undergraduate and graduate students studying equipment design and heat exchanger design.

Manipulation and Control of Jets in Crossflow Aug 07 2020 Fundamental Non-Reactive Jets in Crossflow and Other Jet Systems; Background on Modeling, Dynamical Systems, and Control; Reactive Jets in Crossflow and Multiphase Jets; Controlled Jets in Crossflow and Control via Jet Systems;

Hyperfiltration and Cross-flow Filtration of Kraft Pulp Mill and Bleach Plant Wastes Aug 19 2021

Pressure Drop and Liquid Distribution in a Cross-flow Packed Scrubber Jul 06 2020

Heat Transfer of Finned Tube Bundles in Crossflow Apr 02 2020 This volume provides correlations of heat transfer and hydraulic data for bundles of finned tubes in crossflow at high Reynolds numbers. Correlation graphs and equations, suitable for practical design of heat exchangers, are recommended. Results of studies of the effectiveness of the fin, local and mean heat transfer coefficients are presented. The effect of geometeric parameters of the fins and of the location of tubes in the bundle on heat transfer and hydraulic drag are described. The resistance of the finned tube bundles under study and other factors are examined. This book is intended for heat transfer specialists and design engineers in the fields of heat

exchanger testing and design in the nuclear, power, and chemical process industries.

Thermal Performance Modeling of Cross-Flow Heat Exchangers May 28 2022 This monograph introduces a numerical computational methodology for thermal performance modeling of cross-flow heat exchangers, with applications in chemical, refrigeration and automobile industries. This methodology allows obtaining effectiveness-number of transfer units (e-NTU) data and has been used for simulating several standard and complex flow arrangements configurations of cross-flow heat exchangers. Simulated results have been validated through comparisons with results from available exact and approximate analytical solutions. Very accurate results have been obtained over wide ranges of NTU and C* values in all cases. The proposed procedure constitutes a useful research tool for both theoretical and experimental studies of cross-flow heat exchangers. The following are the unique features of the book: - The monograph includes the computational code named HETE (Heat Exchanger Thermal Effectiveness) in Chapter 5. A version of this code is available for downloading. - The computational procedure could be used for reducing experimental data using the effectiveness - NTU (e-NTU) method in research and industrial laboratories. - Even after more than one century in heat exchanger research, the search for new flow arrangements with higher effectiveness still is an unsolved problem. The present methodology could be a useful tool in pursuing that goal.

Membranes for Food Applications Oct 21 2021 Edited by an internationally recognized leader in the field, this third volume in the series represents the complete reference to membrane processes in the food industry. The handbook adopts a highly practical approach to this hot topic, combining the hands-on experience of the expert authors involved. They provide chapters devoted to such varied applications as dairy fractionation, electrodialysis, pressure-driven membrane processes in alcoholic beverages, membrane emulsification, contactors and bioreactors, as well as membranes for food packaging.