

## Experiment 10: INVERSE SQUARE LAW FOR HEAT

### Objective:

To show that the intensity of radiation on a surface is inversely proportional to the square of the distance of the surface from the radiation source

### Procedure:

1. Follow the basic instruction as written in this section.
2. Connect one of the thermocouple of the target plates, BLACK to the panel and place the plate on the bench, to record ambient temperature.
3. Position the radiometer on the test track at 800mm from the heat source.
4. Set heater temperature to 150°C by using heater controller. Monitor TH reading on the indicator.
5. When TH value has stabilized, record BLACK, TH, the distance,  $x$  and the radiometer reading,  $R$ .
6. Next, move the radiometer position to 700mm from the heated surface and monitor the reading on the display panel. When the value has stabilized, record BLACK, TH, the distance,  $x$  and the radiometer reading,  $R$ .
7. Repeat the above procedure by reducing the distance by 100mm until the radiometer is 300mm from the heated surface.

### Observations:

Distance, $x$ (mm)	Radiometer Reading, $R$ (W/m <sup>2</sup> )	BLACK (°C)	TH (°C)
800			
700			
600			
500			
450			
300			

### Assignment:

Plot the Log of the corrected radiometer reading  $R$  versus  $\text{Log}_{10} x$  graph and calculate the slope. Compare the result with the theoretical value.

# Heat And Mass Transfer Lab Manual

**Camilla Rothe**



## **Heat And Mass Transfer Lab Manual:**

**Engineering Practical Book - Vol-1** Farrukh Hafeez, Mohd Arif, 2016-04-24 The importance of practical training in engineering education as emphasized by the AICTE has motivated the authors to compile the work of various engineering laboratories into a systematic Practical laboratory book The manual is written in a simple language and lucid style It is hoped that students will understand the manual without any difficulty and perform the experiments Heat Transfer Laboratory Manual Prof. Abdul Matheen, 2007 *Food Engineering Laboratory Manual* Gustavo V. Barbosa-Canovas, Li Ma, Blas J. Barletta, 2017-11-13 FROM THE PREFACE The purpose of this laboratory manual is to facilitate the understanding of the most relevant unit operations in food engineering The first chapter presents information on how to approach laboratory experiments topics covered include safety preparing for a laboratory exercise effectively performing an experiment properly documenting data and preparation of laboratory reports The following eleven chapters cover unit operations centered on food applications dehydration thermal processing friction losses in pipes freezing extrusion evaporation and physical separations These chapters are systematically organized to include the most relevant theoretical background pertaining to each unit operation the objectives of the laboratory exercise materials and methods expected results examples questions and references The experiments presented have been designed for use with generic equipment to facilitate the adoption of this manual **Heat and Mass Transfer** Yunus A. Çengel, 2007 With complete coverage of the basic principles of heat transfer and a broad range of applications in a flexible format Heat Transfer A Practical Approach provides the perfect blend of fundamentals and applications The text provides a highly intuitive and practical understanding of the material by emphasizing the physics and the underlying physical phenomena involved Using a reader friendly approach and a conversational writing style the book is self instructive and entertains while it teaches It shows that highly technical matter can be communicated effectively in a simple yet precise language **Thermal-Hydraulics of Water Cooled Nuclear Reactors** Francesco D'Auria, 2017-05-18 Thermal Hydraulics of Water Cooled Nuclear Reactors reviews flow and heat transfer phenomena in nuclear systems and examines the critical contribution of this analysis to nuclear technology development With a strong focus on system thermal hydraulics SYS TH the book provides a detailed yet approachable presentation of current approaches to reactor thermal hydraulic analysis also considering the importance of this discipline for the design and operation of safe and efficient water cooled and moderated reactors Part One presents the background to nuclear thermal hydraulics starting with a historical perspective defining key terms and considering thermal hydraulics requirements in nuclear technology Part Two addresses the principles of thermodynamics and relevant target phenomena in nuclear systems Next the book focuses on nuclear thermal hydraulics modeling covering the key areas of heat transfer and pressure drops then moving on to an introduction to SYS TH and computational fluid dynamics codes The final part of the book reviews the application of thermal hydraulics in nuclear technology with chapters on V V and uncertainty in SYS TH

codes the BEPU approach and applications to new reactor design plant lifetime extension and accident analysis This book is a valuable resource for academics graduate students and professionals studying the thermal hydraulic analysis of nuclear power plants and using SYS TH to demonstrate their safety and acceptability Contains a systematic and comprehensive review of current approaches to the thermal hydraulic analysis of water cooled and moderated nuclear reactors Clearly presents the relationship between system level top down analysis and component level phenomenology bottom up analysis Provides a strong focus on nuclear system thermal hydraulic SYS TH codes Presents detailed coverage of the applications of thermal hydraulics to demonstrate the safety and acceptability of nuclear power plants **Regulatory and Technical**

**Reports** U.S. Nuclear Regulatory Commission. Policy and Publications Management Branch,1981 FUNDAMENTALS OF HEAT AND MASS TRANSFER B. K. VENKANNA,2010-01-01 This comprehensive text on the basics of heat and mass transfer

provides a well balanced treatment of theory and mathematical and empirical methods used for solving a variety of engineering problems The book helps students develop an intuitive and practical under standing of the processes by emphasizing the underlying physical phenomena involved Focusing on the requirement to clearly explain the essential fundamentals and impart the art of problem solving the text is written to meet the needs of undergraduate students in mechanical engineering production engineering industrial engineering auto mobile engineering aeronautical engineering chemical engineering and biotechnology *Regulatory and Technical Reports* U.S. Nuclear Regulatory Commission. Division of Technical Information and Document Control,1980 Includes indexes **Unit Processes in Organic Chemical**

**Industries** ,1982 **Fundamentals of Heat and Mass Transfer** C. P. Kothandaraman,2006 About the Book Salient features A number of Complex problems along with the solutions are provided Objective type questions for self evaluation and better understanding of the subject Problems related to the practical aspects of the subject have been worked out Checking the authenticity of dimensional homogeneity in case of all derived equations Validation of numerical solutions by cross checking Plenty of graded exercise problems from simple to complex situations are included Variety of questions have been included for the clear grasping of the basic principles Redrawing of all the figures for more clarity and understanding Radiation shape factor charts and Heisler charts have also been included Essential tables are included The basic topics have been elaborately discussed Presented in a more better and fresher way Contents An Overview of Heat Transfer Steady State Conduction Conduction with Heat Generation Heat Transfer with Extended Surfaces FINS Two Dimensional Steady Heat Conduction Transient Heat Conduction Convection Convective Heat Transfer Practical Correlation Flow Over Surfaces Forced Convection Natural Convection Phase Change Processes Boiling Condensation Freezing and Melting Heat Exchangers Thermal Radiation Mass Transfer *Applied Mechanics Reviews* ,1996 **Scientific and Technical Books**

**and Serials in Print** ,1989 **Heat and Mass Transfer** Anthony Mills,1995-02-13 This complete reference book covers topics in heat and mass transfer containing extensive information in the form of interesting and realistic examples problems

charts tables illustrations and more Heat and Mass Transfer emphasizes practical processes and provides the resources necessary for performing accurate and efficient calculations This excellent reference comes with a complete set of fully integrated software available for download at crcpress com consisting of 21 computer programs that facilitate calculations using procedures developed in the text Easy to follow instructions for software implementation make this a valuable tool for effective problem solving

**The Software Encyclopedia** ,1986     *Application of Plant Secondary Metabolites to Pain Neuromodulation, Volume II* Liangming Pan,Luteng Zhang,Jun Wang,Wei Ding,2022-11-08     **U.S. Government Research & Development Reports** ,1965     Heat and Mass Transfer: Rudramurthy and Mayilswamy,1900 Heat and Mass Transfer is designed for the core paper on Heat and Mass Transfer for the undergraduate students of mechanical engineering and offers theory in brief detailed derivations plenty of examples and numerous exercise problems This unique approach helps students apply principles to applications

**Nuclear Science Abstracts** ,1965     **Handbook of Heat and Mass Transfer** Nicholas P. Cheremisinoff,1986     **The Software Encyclopedia 2000** Bowker Editorial Staff,2000-05

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