

# Preface

This book is concerned with natural convective heat transfer from relatively short cylinders that have an exposed top surface and are mounted on a plane adiabatic base. Attention is given to cylinders having circular, square, and rectangular cross-sections and to cylinders pointing vertically upward or vertically downward and to cylinders set at an arbitrary angle to the vertical. The interest in the situations here considered arises from the fact that a number of electrical measurement systems and electronic systems that are cooled by natural convection can be approximately modeled as involving short cylinders with a flat exposed top surface. These components are also sometimes mounted at an angle to the vertical. Knowledge of the effect of cross-sectional shape, of the height to cross-sectional size, and of the inclination angle of the cylinder to the vertical on the natural convective heat transfer rate from such cylinders is therefore required in the thermal design of electrical and electronic components that can be modeled as short cylinders with exposed top surfaces. A discussion of representative general past studies of heat transfer from cylinders is first given and then more detailed results for circular, square, and rectangular cylinders are discussed. Attention has mainly been given to the results of numerical solutions but some experimental results are also presented. A discussion of correlation equations based on the numerical and experimental results for some of the situations considered is also presented.

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Cylinders

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