



Importance of heat transfer study

Cooling : ICE engines

COOLING SYSTEMS – Liquid Cooling

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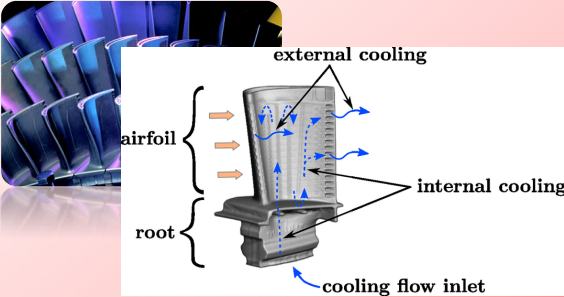
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Cooling : Gas turbine blades

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Cooling : Gas turbine blades



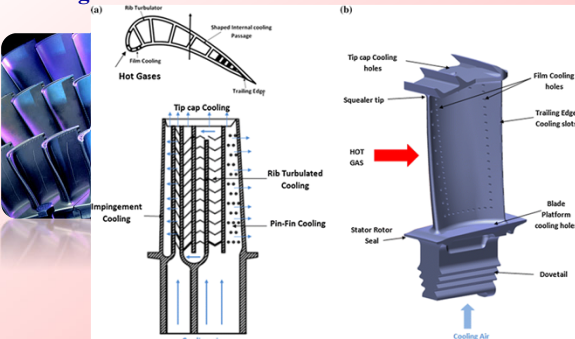
The diagram illustrates the cooling of a gas turbine blade. It shows a cross-section of the blade with labels for 'airfoil', 'root', 'external cooling', 'internal cooling', and 'cooling flow inlet'. Arrows indicate the flow of cooling air from the inlet, through internal passages, and over the external surface of the blade.

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Cooling : Gas turbine blades



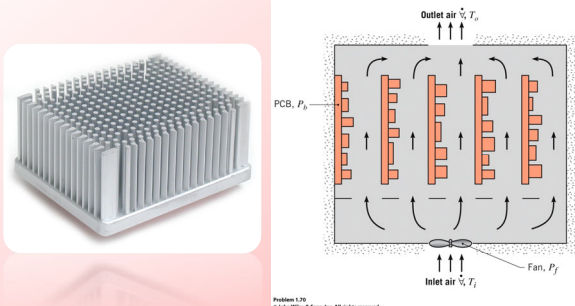
This diagram provides a detailed view of gas turbine blade cooling. It includes labels for 'Rib Turbulator', 'Shaped internal cooling Passage', 'Pin Cooling', 'Hot Gases', 'Trailing Edge', 'Tip cap Cooling', 'Impingement Cooling', 'Rib Turbulated Cooling', 'Pin-Fin Cooling', 'Cooling air', 'Tip cap Cooling holes', 'Squealer tip', 'Film Cooling holes', 'Trailing Edge Cooling slots', 'Shade Platform cooling holes', 'Dovetail', 'Stator Rotor Seal', and 'HOT GAS'. Arrows show the flow of hot gases and cooling air through the various cooling features.

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Cooling : Electronic devices



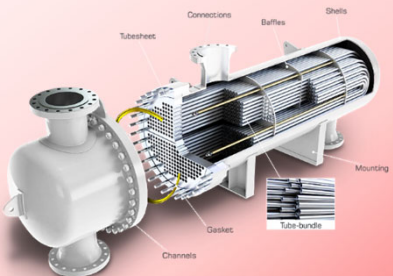
The diagram shows a 3D model of a heat sink on the left and a schematic of a cooling system on the right. The schematic includes labels for 'PCB, P_b ', 'Outlet air \dot{V}_o, T_o ', 'Inlet air \dot{V}_i, T_i ', 'Fan, P_f ', and 'Problem 1.70 © John Wiley & Sons, Inc. All rights reserved.' Arrows indicate the flow of air from the inlet, through the heat sink, and out of the system.

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Heat transfer: Heat exchangers

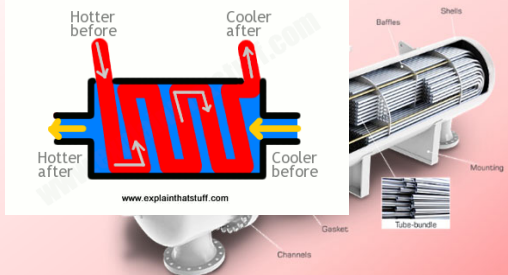


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Heat transfer: Heat exchangers




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Insulation



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Course Overview

I. Introduction

II. Energy equation – thermal energy

Modes of heat transfer: conduction, convection, and radiation

Thermo-mechanical energy equation (0D)

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Course Overview

I. Introduction

II. Energy equation – thermal energy

III. Introduction to conduction

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Course Overview

I. Introduction

II. Energy equation – thermal energy

III. Introduction to conduction

IV. One-dimensional steady-state conduction

Heat Transfer from Extended Surfaces (fins)

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Course Overview

Figure 3.13
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Course Overview

- I. Introduction
- II. Energy equation – thermal energy
- III. Introduction to conduction
- IV. One-dimensional steady-state conduction
- V. Transient conduction (lumped method)

Figure 3.1
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Course Overview

- I. Introduction
- II. Energy equation
- III. Introduction to convection
- IV. One-dimensional steady-state conduction
- V. Transient conduction (lumped method)
- VI. Introduction to convection
 - Transient-3D energy equation for fluid flows
 - The Thermal Boundary Layer

Figure 6.2
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Course Overview

- I. Introduction
- II. Energy equation – thermal energy
- III. Introduction to conduction
- IV. One-dimensional steady-state conduction
- V. Transient conduction
- VI. Introduction to convection
- VII. Convection – external flow

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Course Overview

- I. Introduction
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- IV. One-dimensional steady-state conduction
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- VI. Introduction to convection
- VII. Convection – external flow

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- VIII. Convection – internal flow

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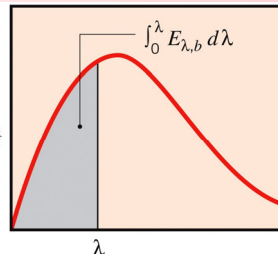
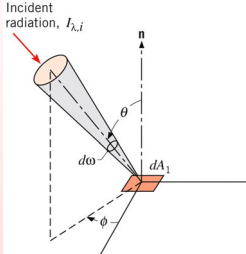


Figure 12.10
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Figure 12.12
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IX. Radiation: Fundamentals

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Course Overview

I. Introduction

II. Energy equation - thermal

III. Introduction to conduction



X. Radiation between surfaces

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