

Chapter 2

High Temperature Heat Exchangers

Bengt Sundén

Division of Heat Transfer, Dept of Energy Sciences, Lund University, Lund SWEDEN

This paper summarizes available information concerning high temperature heat exchangers (HTHEs). Initially HTHEs were developed in ceramic material for gas turbine engine recuperation, high pressure air heating and flue gas recuperation. Recent application areas are found in hydrogen production, high temperature fuel cell systems, low emission power plants etc. The paper presents differences between HTHEs and low temperature heat exchangers (LTHEs) in terms of thermal-hydraulic issues, materials selection, and design and to some extent operating conditions.

INTRODUCTION

Heat exchangers are used in many commercial applications and numerous types can be purchased from a large number of manufactures. Recently, power generation has been exposed to the problems of the exhausts from fossil fuels and global warming. Therefore, the use of renewable energy and the development of nuclear energy have become more important. But, under existing conditions, they are not available, because the exploitation of renewable energy is small compared with the total amount of energy consumed, and nuclear energy is associated with safety issues. Above all, it is important to get rid of the dependence on oil fuel, and usage of coal, which is on the other hand abundant all over the world. In addition, the efficiency of power generation must be improved. High temperature heat exchanger technology has become important for improving the performance of power generation. Many in the field have been counting on the development of a heat exchanger for generating high temperature gas. But, it