PAPER ID:129

MATERIALS USED IN VARIOUS HEAT EXCHANGERS FOR CONSTRUCTION AND THERMAL ENERGY STORAGE

M. A. Boda[*a], RaviGugulothu[b] and Ratna Kumari Jilugu[c]

[a]Assistant Professor, Department of Mechanical Engineering, SKN Sinhgad Institute of Technology and Science, Lonavala, (MS) India.

[b]Department of Mechanical Engineering, JNTUH College of Engineering, Hyderabad, (TS) India

[c]Electrical Machines, Bharat Heavy Electricals Limited Ramachandrapuram, Hyderabad, (TS) India

* Corresponding author

ABSTRACT

This paper summarizes the current research using various materials for heat exchanger construction and storing the thermal energy into various phase change materials or thermal energy storing materials. In this paper a various materials used in the heat exchangers with parallel, counter and cross flow fluid patterns were studied. The materials are suitable for low, medium and high temperature range along with natural and artificial materials considered in this study. The materials are metal, non- metal, metal alloys, metal foam, porous, metal mesh, polymers, fibres, porous materials used in heat exchangers like compact, plate, asymmetric plate, plate-fin, intermediate, modular, ground, earth-air, ceramic heat exchangers etc. The metallic materials like copper, aluminium, stainless steel, titanium, brass etc are used for high temperature liquid and gases. The low temperature liquids like water and glycerol the materials used are ABS, PP,PS, PET, Phenolic, PVC, PC, Epoxy, PPMA, PTFE, Elastomer, LDPE, HDPE etc. The thermal storing materials used to store the thermal energy, sensible and latent heat. The materials discussed in the heat exchanger applications like cooling, refrigeration, HVAC, process industry, marine, land based HE, waste heat recovery etc. The proper material can select for particular application for resistance to corrosion and erosion, taken into account. The most of the materials discussed in this paper are compatible with low and high heat transfer fluids, also capable of withstanding high temperature and pressure requirements of heat exchangers without sacrificing thermal performance. Through this paper one can select the best suitable material for their work.

Keywords: Heat Exchanger, Material Selection, Phase Change Material, Thermal Energy Storage