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Redesign of Heat Transfer Pipes in Radiators, Air-Conditioners and Refrigerators for Higher Efficiency

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ABSTRACT

Heat transfer is a surface phenomenon. Instead of straight hollow rectangular cross section tubes with heat transfer liquid passing through it, a triangular cross section tubes having the tip of the triangle facing front to receive the flow of air is the proposed new geometrical design. With minimum material maximum heat transfer as a whole is the aim of the new Radiator design.

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Introduction

Radiators are used to remove excess heat in Internal combustion Engines used in automobiles and stationary power producing engines. Water or suitable fluid is circulated around the Internal combustion engines and this is passed through a radiator to transfer the heat to the atmosphere.

Heat transfer being a surface phenomenon by increasing surface area of the fluid pipe with incident angle of the pipe surface better exposed the flowing air is expected to be increasing heat transfer rate.

Heat Removal using Radiators

Radiators are physical device to remove excess heat using a fluid which is normally water mixed with additives to enhance boiling and freezing point of water. Commonly radiators can be seen used with Internal combustion Engines used in automobiles.

Triangular cross sectional hollow fins are new and it is proposed to be used instead of mere rectangular cross-sectional fins. The heat transfer modes being conduction, convection and radiation.

It is by all the three modes the heat transfer is expected to get increased by using triangular cross section hollow fins. This is because of increased surface area for the triangular cross-sectional fins increased heat transfer can occur.

Higher Heat Removal Rate

Heat transfer by air flow either forced using fan or natural heat transfer by temperature difference are the normal means. Heat transfer is a continuous natural phenomenon. The present design is a conceptual new idea to enhance the heat transfer at a faster rate by replacing existing reheat octangular cross section heat transfer fluid pipes into triangular hollow pipes heat.

Optimizing the Required Number of Metal Fins

After replacing the rectangular hollow pipes into hollow triangular pipes additional Meta Fins which are used previously across the heat transfer pipes can be reduced in number.

Included Angle of Triangle

Around 12 degrees to 20 degrees can be chosen as an included angle of the triangle for the triangular cross section of the proposed heat transfer hollow pipes. Periodical Cleaning of the pipes using water jets can be done to maintain the heat transfer rate.

Redesign of Radiators in Air Conditioners

Radiators are otherwise called as Condenser and Evaporator in Air-Conditioners

The triangular cross section fluid pipes can be used to enhance the heat transfer in air conditioners. Fluid used can usual appropriate Refrigerant in air conditioners.

Redesign of Radiators Tubes in Refrigerators and Electrical Transformers

Triangular shape of heat transfer pipes/ Tubes can be used in refrigerators and in the application of electrical transformers to increase the surface area of heat transfer and thereby increase in heat transfer rate can be achieved.

Conclusion

Various Heat transfer applications and there in their corresponding appliances the triangular geometry heat transfer hollow pipes can be used to increase the surface area and thereby heat transfer efficiency is expected to get improved.

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