

HEAT PIPE SCIENCE AND TECHNOLOGY: A HISTORICAL REVIEW

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Abstract

This presentation attempts to give a historical review of heat pipe science and technology up to the present state. In a first part, a brief introduction is given into design, operation and performance limits of heat pipes and closed two-phase thermosyphons. In a second part, the historic development of closed two-phase thermosyphons and heat pipes is highlighted. It includes the history of the International Heat Pipe Conference (IHPC) series, whose 40 years anniversary we are celebrating this year. A list of overview reports and textbooks is given. A large section of this second part deals with major inventions and developments from the origins to our time. Here one can see, rather compressed and certainly not fully complete, the multitude of heat pipe/thermosyphon designs which have been developed to solve a great variety of thermal control tasks. It has also been tried to classify the numerous members of the heat pipe family in the form of a table of passive liquid-vapour heat transfer devices. The third part of the presentation deals with applications. From five of the many application fields, some selected examples are given: thermosyphons for permafrost stabilization and deicing; heat pipe/thermosyphon heat exchangers; cooling of electric and electronic devices and components; liquid metal heat pipes for temperature calibration, material treatment and solar applications; (open and closed) two-phase thermosyphons for passive nuclear safety systems.