**Impact of geometrical parameters on thermo-hydraulic properties of casted open cell metal foam**

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**ABSTRACT**: Thermo-physical and flow properties depend strongly on local morphology of both pore and solid matrix. Local change in the structure could govern the properties (e.g. constriction, strut cross section, surface roughness etc.). Accurate evaluation of these properties becomes critical for various uses. Yet, solid foam structure and properties are still incompletely characterized [1].

The main focus is to study the impact of pore shape change on thermo-physical and flow properties for different porosities on regular periodic open cell metal foam. Imorph [2] software is used to determine geometrical parameters precisely. We gave emphasis on anisotropic behavior of casted open cell metal foam which is elongated in one direction conserving periodic nature and studied its influence on pressure drop characteristics namely permeability and inertia coefficient. Moreover, anisotropy has strong influence on heat transfer coefficient. Influence of cell aspect ratio on both thermal conductivity and heat exchange coefficient will be presented. Finally, correlations relating geometrical parameters to thermo-hydraulic bulk properties of casted open cell foam will be presented. All results will be fully discussed and compared to the data available in the literature.

**REFERENCES**

[1] J.M. Hugo and F. Topin, “Metal foams design for heat exchangers: Structure and effective transport properties”, in Heat and Mass Transfer in Porous Media, Springer-Verlag, Ed.-2011

[2] E. Brun et al., “IMorph: A 3D morphological tool to fully analyze all kind of cellular materials” in Cellmet’08, Dresden, Germany, 2008