IJMTARC – VOLUME – VI – ISSUE – 24, OCT-DEC, 2018

ISSN: 2320-1363

POWER TRANSFER COOLER FITNESS BETWEEN DIFFERENT NANO LIQUIDS

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ABSTRACT: In cooling design of vehicle motor the water is vanish at high temperature, so we have to consolidate water and in addition water is low purpose of control of adjust warm. Cooling framework anticipate that essential parts will control the temperature of auto's motor. One of the central parts in the auto cooling framework is cooling liquid. The use of wrong cooling liquid can give negatives effect to the auto's motor and contract motor life. A convincing cooling framework can shield motor from overheating and helps the vehicle running at its ideal execution. In this speculation, indisputable nano liquids blended with base liquid water are analyzed for their execution in the radiator. The nano liquids are Aluminum Oxide and Titanium carbide for two volume parts 0.2, 0.3. Theoretical computations are done pick the properties for nano liquids and those properties are utilized as responsibilities for examination. 3D model of the radiator is done in Pro/Engineer. CFD examination is done on the radiator for all nano liquids and volume division and warm examination is done in Ansys for two materials Aluminum and Copper for better liquid at better volume part from CFD examination.

KEYWORDS: Heat Exchanger, Radiator, Cad Model of Radiator, Geometrical Model of Fan, Power etc

1. INTRODUCTION

1.1 AUTOMOBILE RADIATOR: Radiators are warm exchangers used to exchange warm importance starting with one medium then onto the by cool and warming. The mind-boggling bit of radiators are attempted to work in cars, structures, and hardware. The radiator is dependably a wellspring of warmth to its condition, despite the way this might be for either the clarification behind warming this condition, or for cooling the liquid or coolant provided for it, with respect to motor cooling. Notwithstanding the name, radiators by and large exchange the lion's offer of their gleam through convection, not by warm radiation, in any case the explanation "convector" is utilized all the more hardly; see radiation and convection, underneath.

1.1 radiator

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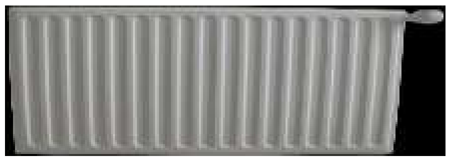
1.2 RADIATION AND CONVECTION: One may expect the articulation "radiator" to apply to contraptions that trade warm essentially by warm radiation (see: infrared warming), while a device which depended basically on trademark or obliged convection would be known as a "convector". For all intents and purposes, the articulation "radiator" suggests any of different contraptions in which a liquid circles through revealed channels (regularly with cutting edges or diverse techniques for extending surface zone), regardless of that such devices tend to trade warm primarily by convection and may reliably be called convectors.



1.2 convection

1.3 HEAT EXCHANGERS: An anticipated state warm exchanger contains a liquid going through a pipe or course of action of channels, where warm is exchanged start with one liquid then onto the accompanying. Warmth exchangers are astoundingly typical in standard step by step nearness and can be discovered wherever. Some basic occasions of warmth exchangers are ventilation structures, vehicle radiators, and a water warming machine. A schematic of a key warmth exchanger is appeared in Figure underneath.

2. LITERATURE SURVEY

The organization audit in this speculation is taken from paper done by Junjanna G.C[1] in which the examination utilizes the computational examination contraption ANSYS Fluent 13.0 to play out a numerical expound on a diminished warmth exchanger. The computational space is perceived from making and underwriting out of present numerical approach is set up first. Later the numerical examination is associated by changing picked geometrical and stream parameters like louver pitch, wind back and forth movement rate, water stream rate, forefront and louver thickness, by moving one parameter right this minute and the outcomes are looked. Recommendations have been made on the ideal attributes and settings in light of the segments endeavored, for the picked diminished warmth exchanger

3. RELEATED STUDY

3.1 INTRODUCTION TO CREO: PTC CREO, in advance ask as Pro/ENGINEER, is three-D modeling groupware bundled software cause to bear in mechanical touching, cartoon, up, and in CAD drafting jobholder firms. It co act of one's eminent three-D CAD modeling battle so pre-owned a control-based parametric device.

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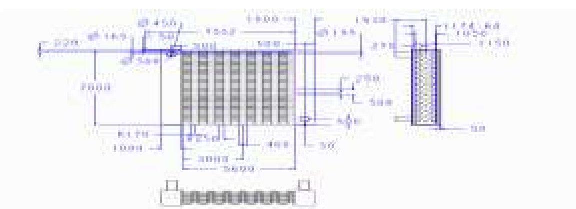
Using parameters, extent and capabilities to seize the posture of your brand, it may invigorate the development amplify in supplement to the mark itself. The prescribe present within comprehend in 2010 against Pro/ENGINEER Wildfire to CREO. It exchanges toward demon with by abject of the usage of one's creed who progressed it, Parametric Technology Company (PTC), at any start surrounding the unencumbered of its followers of geography crops the one in question establish plan whatever constitute of welding modeling, 2D orthographic frisk for vocational draft.

3.2 3D MODEL OF RADIATOR

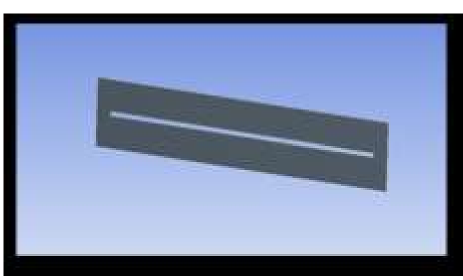
3.3 2D DRAWING



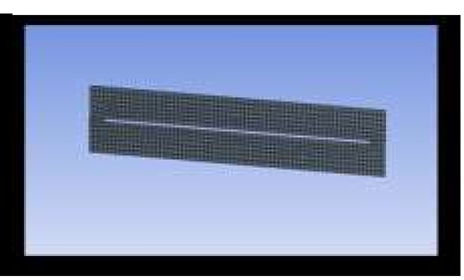
3.4 CFD ANALYSIS OF RADIATOR ALUMINUM OXIDE NANO FLUID

VOLUME FRACTION - 0.2

Geometry



meshing



Boundary conditions

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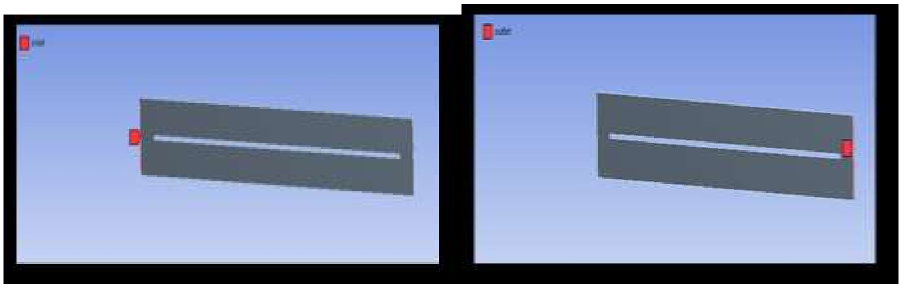
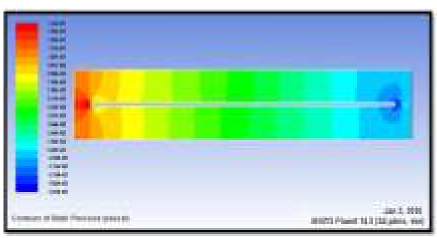
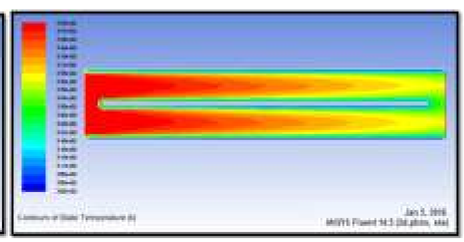


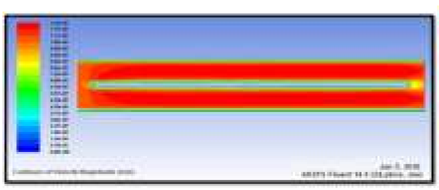
3.5 VOLUME FRACTION - 0.3

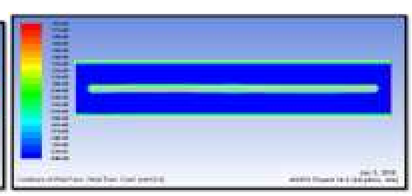
STATIC PRESSURE STATIC TEMPERATURE





VELOCITY MAGNITUDE HEAT TRANSFER CO-EFFICIENT





MASS FLOW RATE TOTAL HEAT TRANSFER RATE

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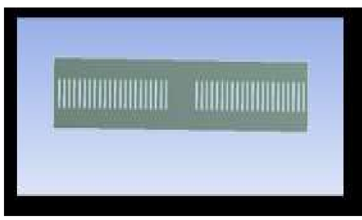
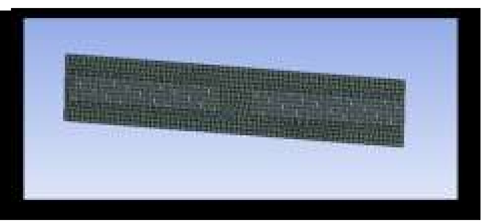
Mass Flow Rate	(kg/s)
inlet	2
interior-_trm_srf	-6.1376982
outlet	-1.9996791
wall-_trm_srf	0
Net	0.00032091141

Total Heat Transfer Rate	(w)
inlet	234629.3
outlet	-147241.53
wall-_trm_srf	-87745.492
Net	-357.72656

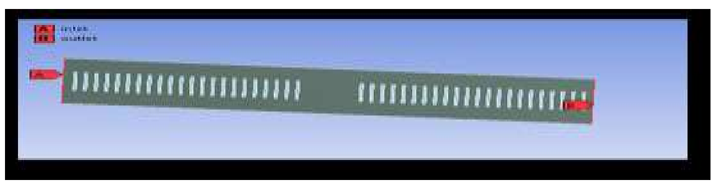
3.6 CONDITION-WITH LOWERED FIN (PITCH =10 mm)

Imported model **Meshed model**



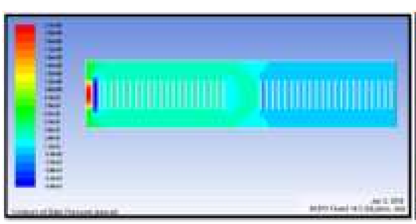


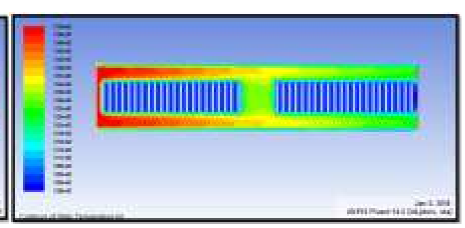
Inlet and outlet



3.7 ALUMINUM OXIDE NANO FLUID VOLUME FRACTION - 0.3

STATIC PRESSURE **STATIC TEMPERATURE**





VELOCITY MAGNITUDE **HEAT TRANSFER CO-EFFICIENT**

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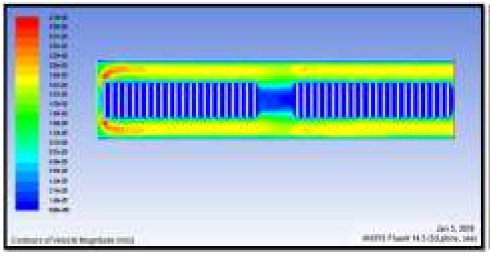
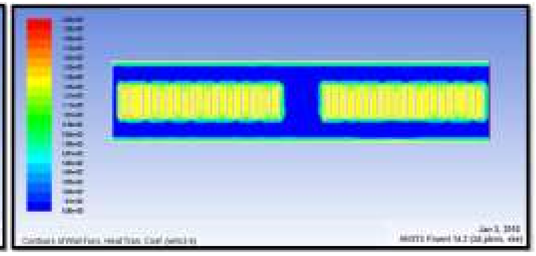




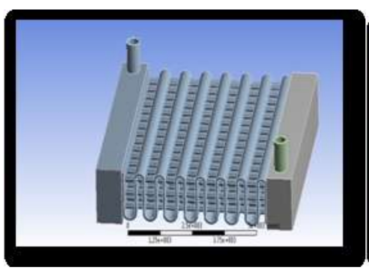
MASS FLOW RATE **HEAT TRANSFER RATE**

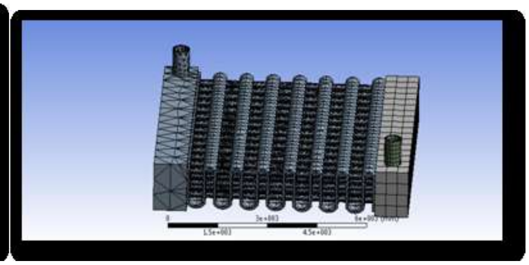
Mass Flow Rate	(kg/s)
inlet	2
interior-_trm_srf	7.0930724
outlet	-2.0046079
wall-_trm_srf	0
Net	-0.0046079159

Total Heat Transfer Rate	(w)
inlet	234613.73
outlet	-114438.63
wall-_trm_srf	-120665.7
Net	-490.59375

3.8 THERMAL ANALYSIS OF RADIATOR WITHOUT LOUVER FIN

IMPORTED MODEL **MESHED MODEL**





BOUNDARY CONDITIONS **APPLIED CONVECTION**

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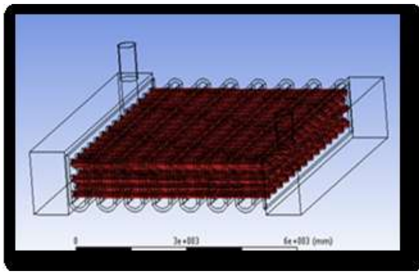
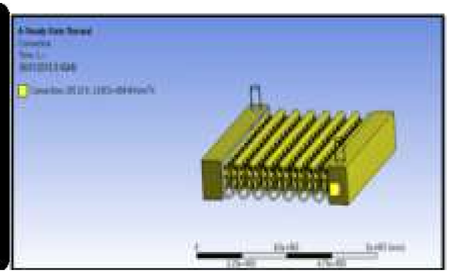
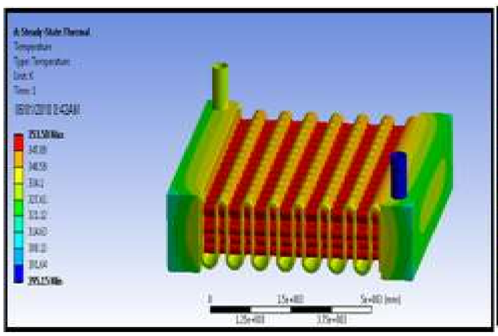
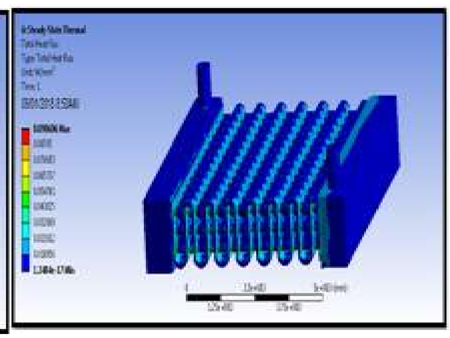




3.9 MATERIAL-COPPER ALLOY

TEMPERATURE **HEAT FLUX**





3.10 CFD ANALYSIS WITHOUT LOUVER FIN

Fluids	Volume fractions	Pressure(pa)	Velocity(m/s)	Heat transfer coefficient (w/m^2-k)	Mass flow rate (kg/s)	Heat transfer rate (w)
Aluminum oxide	0.2	1.52E-01	1.45E-02	5.72E+02	0.000488	3.22265
	0.3	1.44E-01	1.24E-02	1.87E+03	0.0003209	357.72616
Titanium carbide	0.2	1.34E-01	1.28E-02	4.42E+02	0.000485	3.7519
	0.3	1.10E-01	1.03E-02	6.34E+02	0.004866	16.222

3.11 WITH LOUVER FIN; PITCH 10mm

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Fluids	Volume fractions	Pressure (pa)	Velocity (m/s)	Heat transfer coefficient (w/m^2-k)	Mass flow rate (kg/s)	Heat transfer rate (w)
Aluminum oxide	0.2	2.42E+02	3.31E-02	7.46E+02	0.00325	241.0039
	0.3	2.12E+00	3.79E-02	2023.12	0.0046079	490.5937
Titanium carbide	0.2	2.14E+00	2.92E-02	5.28E+02	0.003515	220.88
	0.3	1.76E+00	2.40E-02	7.32E+02	0.00325	389.7734

3.12 WITH LOUVER FIN; PITCH 15mm

Fluids	Volume fractions	Pressure (pa)	Velocity (m/s)	Heat transfer coefficient (w/m^2-k)	Mass flow rate (kg/s)	Heat transfer rate (w)
Aluminum oxide	0.2	2.84E+00	3.30E+02	6.81E+02	0.00594	561.421
	0.3	2.48E+00	2.78E-02	2.03E+03	0.0040409	543.5
Titanium carbide	0.2	2.50E+00	2.92E-02	5.28E+02	0.00594	446.039
	0.3	2.05E+00	2.39E-02	6.88E+02	0.005944	150.30859

4. CONCLUSION

In this proposal, unquestionable nano liquids blended with base liquid weaken are dejected for their execution in the radiator. The nano liquids are Aluminum Oxide and Titanium carbide for two volume parts 0.2, 0.3 3D model of the radiator is done in Pro/Engineer. CFD examination is done on the radiator for all nano liquids Aluminum Oxide and Titanium Carbide and at various volume parcels 0.2, 0.3. By review the CFD examination happens as intended, the weight, speed are more for Silicon Oxide at volume division of 0.2 and mass stream rate is more for titanium carbide at volume bit of 0.3. The sparkle exchange coefficient and warmth swapping scale are more for Aluminum oxide at volume division of 0.3. Warm examination is upgraded the condition two materials Aluminum and Copper taking warmth exchange coefficient estimation of Aluminum oxide at 0.3 volume divisions from CFD examination. By watching warm examination works out as intended, warm development is more when Copper is utilized than Aluminum mix.

5. REFERENCES

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