International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 01 | Jan 2021 www.irjet.net p-ISSN: 2395-0072

Thermostat Valve Thermal Comfort Analysis Using F.E.A

Prof. Amit Patil[1], Vinay Hogle[2], Vyankatesh Gaikwad[3], Sujal Randive[4], Rahul Thakare[5]

[1]Professor, Automobile Department, Saraswati College of Engineering, Navi Mumbai, Maharashtra, India
[2,3,4,5]Student, Automobile Department, Saraswati College of engineering, Navi Mumbai, Maharashtra, India

---

Abstract - *This paper presents a review of recent research that has been carried out on the thermal analysis of thermostat valve play important role in automobile Colling system. And it's working can change according to its different temperature. Thermostat valve has been extensively study with the primary purpose of reducing engine temperature and improving performance. Thermostat valve play a key role in automobile cooling system for stable the engine temperature in working condition. Here we use computer model analysis and simulation to investigate thermal changes in thermostat valve using two different material for analysis of thermostat Valve thermal analysis and simulation shows the thermal changes in thermostat valve and how it will affect on cooling system*

Key Words: **Thermal change, cooling system, two material, stable**

1. INTRODUCTION

Thermal analysis is a branch of materials science where the properties of material are studied as they change with temperature.

Thermal analysis is a branch of materials science where the properties of material are studied as they change with temperature. Thermal analysis is also often used as a term for the study of heat transfer through structure many of the basic engineering data for modeling such systems comes from measurements of heat capacity and thermal conductivity. Heat is affect on the engine when they are working. The thermostat is like a valve that open and closes as a function of its temperature. The thermostat isolate the engine from the radiator unit it has reached a certain minimum temperature without a thermostat, the engine would always lose heat to

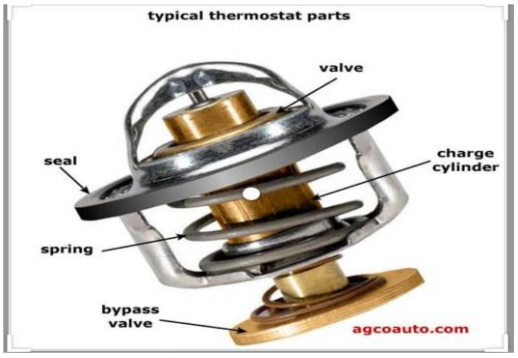

Fig-1 Thermostat valve

The radiator and take longer to warm up. The cooling system serves three important functions. First, it removes excess heat from the engine; second, it maintains the engine operating temperature where it works most efficiently; and finally, it brings the engine up to the right operating temperature as quickly as possible. Thermostat metal is a composite material, usually in the form of a strip or sheet, made up of two or more metallic layers having different coefficients of expansion. Thermostat valve made of steel and their charge cylinder made of copper then we are change charge cylinder material like brass because brass melting point is low as compared to copper increase thermostat valve life

1.1 PROBLEM FACING WITH COPPER MATERIAL 1

The thermostat valve is a heat sensitive valve which allows coolent to flow through the valve open and. closes according to engine temperature. When start the engine heats up properly, once the temperature rise it's open up and let the hot coolent passes through the radiator. If the thermostat valve gets stuck in the closed position it won't let hot coolent passes through the radiator and lead to engine overheating. An easy way to inspect the same is to check the temperature of the upper radiator hose. If it not hot and car still showing overheating sign it shows that the thermostat has malfunctioned.

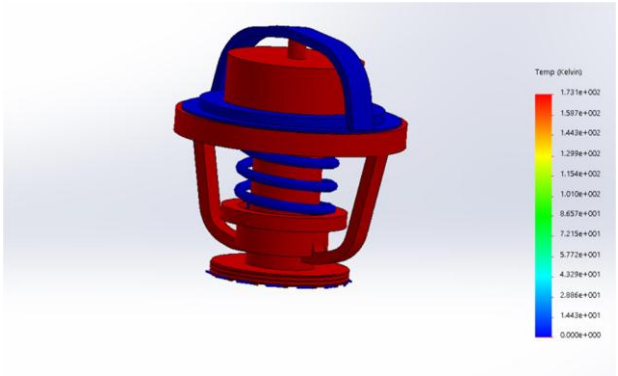

Fig-2 Analysis of copper

Thermostat valve copper pipe section is that they sometime fail when water temperature is above 180 degree furthermore condensation often from inside the pipe when this condensation freeze its block water flow.

Normally in the industry the material use for the thermostat valve is copper but with the copper there is to many disadvantage facing the valve .just like at the time of discharge the water temp is above to 85 °C but with the brass the valve is open at 75°C is because at the place were the atmospheric temp is very low there valve can open as early as possible. But with copper the valve is open at the 85°more than that so heat plug used for solution there. Cost of copper per kilogram is 600 or more than that in the less pries the brass work efficiently.

1.2 SOLUTION WITH BRASS

In the valve the material of charge cylinder can change beass is the proper material for the charge cylinder .withe the brass the efficiency of valve is increase as well as life of valve is increase. The thermal conductivity of brass is suitable foe charge cylinder .that why the brass material we chose. Brass is having with stand capacity up to 930°C the melting point is occur of brass. The recyclation of brass is too easy or the material is reused also brass having high withstand property while machining prosses .the corrosion ratio of brass as compere to copper is high menace the charge cylinder of brass is having less corrosive property then copper. That's why the life of brass charge cylinder is increase.

Fig-3 cross section of valve and charge cylinder

All main work in thermostat valve is doing the wax. The member which at time of the water temp is cold the wax in form of solid and at time of temp hot its became the liquid form that's why flow of water is possible .with the brass the wax should become liquid early as campier to copper its beneficial because in the winter session at there is lot more problem facing with enging worming with the brass the enging should worm easily or profitable as camper to copper.

2. COST MARGIN AND BEHAVIOUR OF TEMPRETURE TABLE OF BOTH MATERIAL

Table -1:

	Melting temperature		
Material	°C	°F	Cost(per kg)
Copper	1085°C	1984°F	608.40
Brass	930°C	1710°F	300-315

3. CONCLUSIONS: performance of thermostat valve is improved by the reducing of cost, timing of opening primary valve with the increasing the life of parts. Never us this material as before. Hence the material we chose is profitable.

ACKNOWLEDGEMENT would like to express my sincere gratitude to Prof. Amit Patil , Automobile Engineering Department. Saraswati College of Engineering, Kharghar for providing their invaluable guidance, comments and suggestions.

REFERENCES

[1] D. Kornack and P. Rakic, "Cell Proliferation without Neurogenesis in Adult Primate Neocortex," Science, vol. 294, Dec. 2001, pp. 2127-2130, doi:10.1126/science.1065467.

[2] M. Young, the Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.

[3] R. Nicole, "Title of paper with only first word capitalized," J. Name Stand. Abbrev., in press.

[4] K. Elissa, "Title of paper if known," unpublished.