





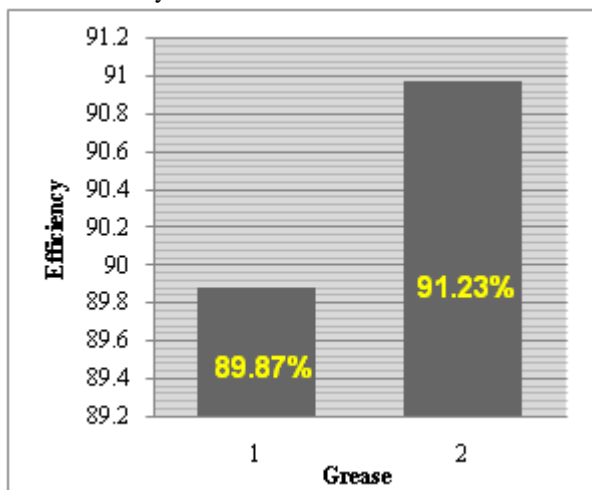
resistance, corrosion protection, etc. Lubrication is one of the most important components of a gearbox. Lubricant has two main purposes to serve. It keeps components from wearing and also keeps them cool. Most gearbox failures can be attributed to improper lubrication. Viscosity is a key attribute of the gear lubricant (grease in this case). The proper oil viscosity will provide an oil film between meshing gear teeth. This oil film is very thin and keeps the gear teeth from actually contacting each other. With too thin of a film or no film, failures such as scoring or wear will occur. By using grease KluberBarrierta L 55/2 the efficiency calculated for the planetary gearbox is approximately 89%. Seven different Greases are compared on the basis of their kinematic Viscosity and the graph is plotted against the efficiency ( for first stage). Various greases with different kinematic viscosity have been taken , and calculation of friction coefficient is carried out keeping all other factors and losses constant. The following graphs were plotted on the basis of obtained values.

The pitch line speed of the gear is a good index of the required viscosity [8]. An empirical equation for determining required viscosity is

$$V_{40} = \frac{7000}{(v)^{0.5}}$$

Where,

$V_{40}$  = Lubricant kinematic viscosity at 40°C  $v$  = operating pitch line velocity. m/s



**Figure 4:** Efficiency of Gearbox with Existing grease Vs grease with optimum viscosity

#### 4. Conclusion

Selecting a proper viscosity can help to control friction and thus improve efficiency of the gearbox. It was assumed that higher the viscosity of the lubricant, better will be the performance of the gearbox. But excessive viscous grease will lead to develop viscous drag and power loss thereby affecting the efficiency. The experimental results showed that the efficiency is increased by 1.2% using the grease 2 with viscosity close to the optimum viscosity, over the other greases. Grease 1 is the currently used grease.

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