CHAPTER-4
MATERIAL AND EQUIPMENTS USED

The material used for moulding of bush in this work was nylon- 6. Specifications of the material, equipments and tools used has been discussed in the following paragraphs.

4.1. NYLON

Nylons are semi-crystalline polymers with a good range of properties. Nylons are widely used because they have a good cost to performance ratio. The term nylon refers to a family of plastics. The two most common grades of nylon are Nylon 6 and Nylon 6/6. The number refers to the number of methyl groups which occur on each side of the nitrogen atoms (amide groups). The term polyamide, another name for nylon, reflects the presence of these amide groups on the polymer chain. The difference in number of methyl groups influences the properties of the nylon.

Unlike polycarbonate, nylon is crystalline in nature; so the molecular chains do not have large substituent groups (such as the phenyl ring in polycarbonate). The crystalline nature of the material is responsible for its wear resistance, chemical resistance, thermal resistance, and higher mold shrinkage. [A Guide to Nylon web site (78)]
4.2. PROPERTIES OF NYLON

Some important properties of the Nylon are listed below

1. Excellent chemical resistance
2. Excellent wear resistance
3. Moderate to high price
4. Fair to easy processing
5. Very good physical properties but the moisture has significant effect on the properties.
6. Very good heat resistance

Before processing, nylon-6 is dried in a furnace for three to four hours at $50^\circ\text{C}$ to $60^\circ\text{C}$ to remove moisture contents. The absorption of moisture by nylon is a completely reversible reaction. Drying before processing will drive off all but a small portion of water molecules. The rate at which the nylon can be dried and at which it absorbs moisture varies with each grade of nylon. Heating to moulding temperatures while wet will result in hydrolytic degradation, a reaction in which the molecular bonds are severed.

4.3 EQUIPMENT USED

The production equipment employed in this study is a precision injection machine, model: PPU7690TV40G, over all dimensions $856\times1500\times2480$ mm
manufactured by the Targor Corporation. The machine has the following specifications

Trade Name- PPU7690TV40G  
Grade Name-CM1091  
Material Structure-Crystalline  
L/D ratio-18.3  
Heating Capacity-24.5 kW  
No of Heating Zones-4  
Nozzle Contact Force-60 kN  

**CLAMPING UNIT**  
Closing Force-2500 kN  
Mould Open Stroke-700mm  
Mould Height-250mm×400mm  
Distance between plates-950×1100 mm max.  
Ejector Force-75 kN  
Ejector Stroke-150 mm  

**OVER ALL DIMENSIONS**  
6856×1500×2480 mm
OIL TANK CAPACITY

Main/Reserve-500/200

Wt. of Machine-10.7 tons

Figure 4.1 Injection Molding Machine
Figure 4.2 Feeding System
Fig. 4.3 Multi Cavity Mould
After nylon-6 bush was moulded, to measure hardness shore hardness tester was used, while to measure surface profile or bulging a V shaped anvil attached with a dial indicator was used.