

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

For the methodology process, there are a few stages that have been involved in this project such as experimental preparation, experimental design, material preparation, injection molding and part testing. In order to choose the material, ABS has been chosen in this study because of its properties. ABS has good mechanical properties such as good balance properties, toughness and strength.

Besides that, it is easy to mold. Below is the list of ABS properties:

- Maximum temperature : 176°F(80°C)
- Minimum temperature : -4°F(-20°C)
- Melting point : 221°F(105°C)
- Tensile strength : 4300 psi

3.1.1 Flow Chart for Methodology

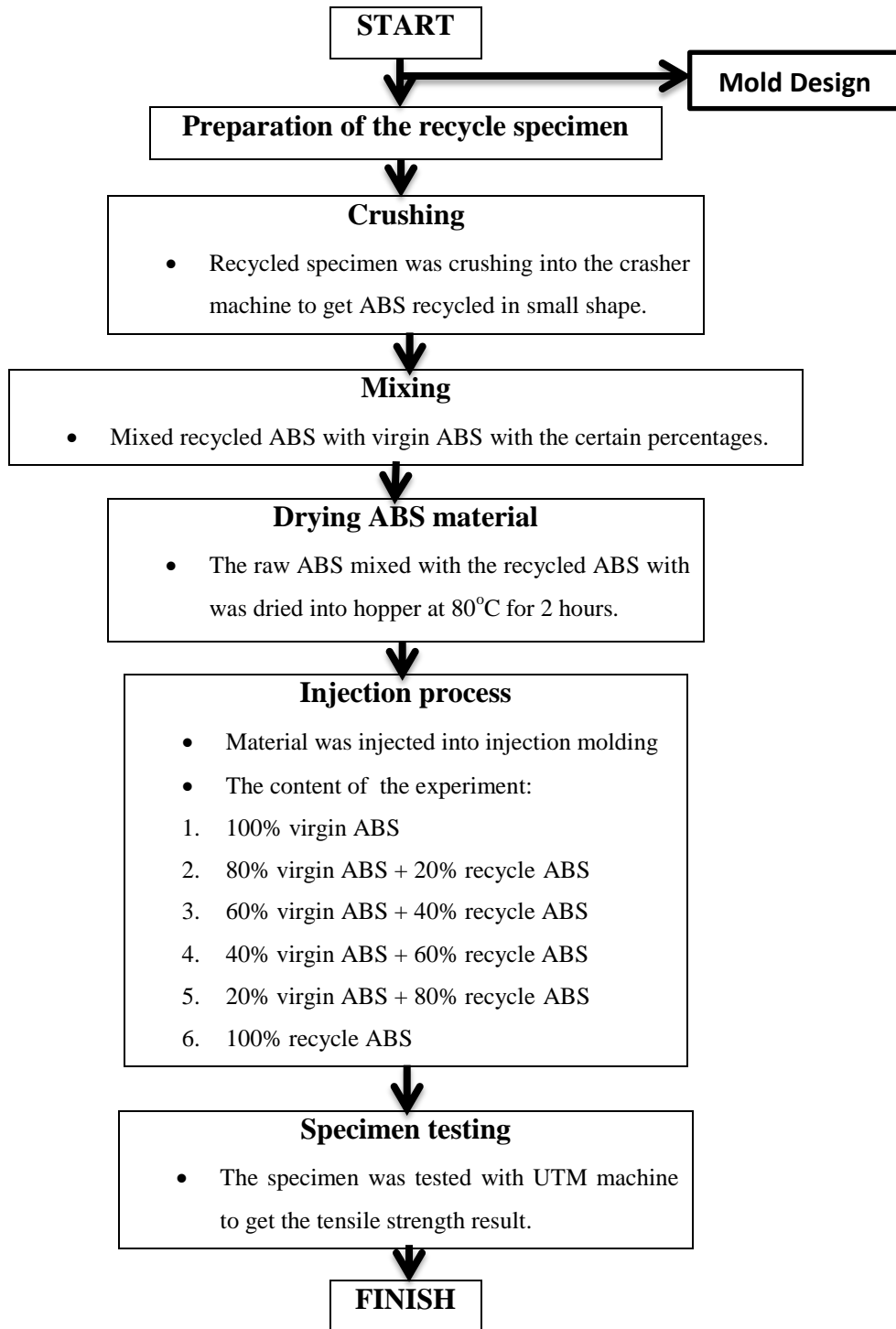


Figure 3.1: Flowcharts for methodology

3.2 EXPERIMENTAL DESIGN

In doing this experiment, five samples for each experiment was prepared in order to obtain the average for the result based on ASTM requirement. This because the result that we get more accurate. The method for testing part is followed the ASTM D638 standard. Then, the sample was tested at UTM (Universal Testing Machine). There is the list of experiment that was tested:

- i. Experiment 1: Contents 100% virgin ABS
- ii. Experiment 2: Contents 80% virgin ABS + 20% recycle ABS
- iii. Experiment 3: Contents 60% virgin ABS + 40% recycle ABS
- iv. Experiment 4: Contents 40% virgin ABS + 60% recycle ABS
- v. Experiment 5: Contents 20% virgin ABS + 80% recycle ABS
- vi. Experiment 6: Contents 100% recycle ABS

3.3 EXPERIMENTAL PREPARATION

The steps that involved in this experimental preparation such as mold design and also mold preparation. In order to make mold for dog-bone shape, we choose P20 steel plate because P20 pure steel quality due to vacuum degassing treatment and screwing die is formed by forging, and the flat steel and round steel are formed by rolling at a high ratio of deformation. It is compact in structure, suitable for making the plastic molds requiring polish or etches machining.

P20 is chrome-moly tool steel made specifically to fill the requirements for the machined cavities and forces used in zinc die casting and plastic molding. It is delivered fully quenched and tempered to approximately Brinell 300. Other hardness levels may be obtained through additional heat treatment. Table 3.1 shows the properties of P20 steel plate.