

Participant Handbook

Sector
Rubber

Sub-Sector
1. Tyre 2. Non-Tyre

Occupation
Moulding/Curing

Reference ID: **RSC/Q0205, Version 1.0**
NSQF Level 4



**Compression Moulding
Operator**

1. Overview on Rubber Industry and Generic Skills



Unit 1.1 - Introduction to Rubber Industry and Compression Moulding



1.1.7 Indian Rubber Industry

There are around 6000 unit consisting 30 large, 300 medium scale, and about 3600 small scale and mini sector units. These units produce more than 35000 rubber products, providing employment to four hundred thousand people, which too incorporate 22000 technically eligible personnel, granting Rs. 40 billion to the National Exchequer through duties, taxes, and other levies.

India consumes nearly 17 lakh tonnes of rubber (including natural, synthetic and reclaim) annually for producing a wide range of rubber products. Tamil Nadu (3.57 lakh tonnes), Kerala (2.10 lakh tonnes) and Maharashtra (1.98 lakh tonnes) are top three rubber consuming states in the country.

1.1.8 Rubber Consumption in India

The major sectors consuming rubber in India are as follows:

- Automotive tyre sector 66%
- Bicycles tyres and tubes 8%
- Footwear 6%
- Belts and hoses 4%
- Camelback and latex products 7%
- Other Products 9%

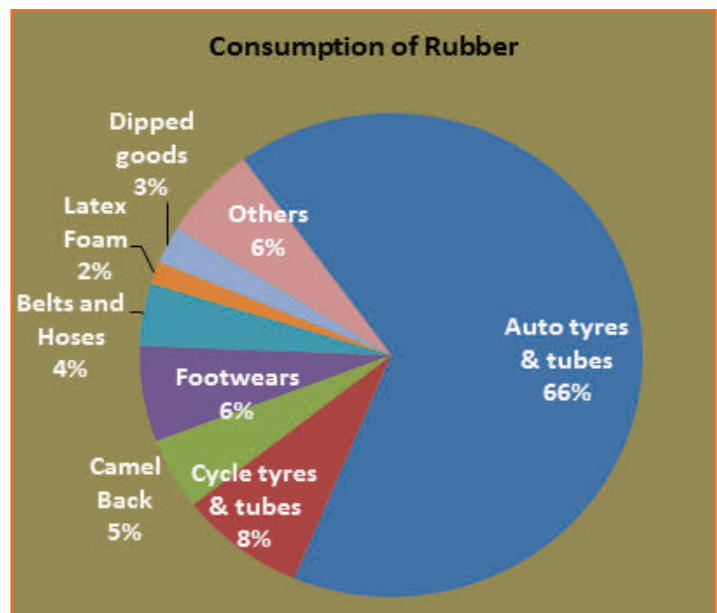


Fig.1.1.1: Pie Chart for Rubber Consumption in different Industries

1.1.9 Introduction to Factory/Section

With a thin guide for the operators in the entire rubber industry, the trainer should provide the following minimum information on the factory/section where the participant is employed.

S. No	Description
1	Name of the company
2	Location of the company
3	Type of company ie ; Government, Public sector or Private ltd company
4	Names of the important executives
5	Strength of the company, no of operators
6	No of departments, sections

cannot be executed if the raw materials are not correct, so the raw materials are always checked thoroughly just because of this reason. If, in case a material is supposed to be used in cold climate, then a test of that material's resistance against cold is important. A singular type of low – temperature test is to include a test piece, and hence is freezed at a very low temperature. The temperature is then slowly brought up and it is noted if the rubber starts to be flexible again. Alternative classical tests are tensile strength, elongation, and hardness.

1.1.11 Role of Compression Moulding Operator

The compression moulding operator is responsible for feeding the rubber compound and other required materials to the machine, performing the moulding operation and operating press to produce rubber parts. It is his responsibility to follow correct procedures as per the SOP of the company List of the activities that are performed by the extruder operator:

- Feed rubber compounds to the Machine.
 - » Ensuring housekeeping and safety in the extrusion area
 - » Feeding the compound to the machine
- Operate Compression Moulding Machine following company's SOP.
- Carry out curing of the product as per the SOP.
- Undertake post moulding/curing activities such as unloading, handling and shifting, trimming, deflashing, batch marking, sampling etc.
- Carry out housekeeping activities such as waste disposal, cleaning equipment, dealing with accidental damage, store housekeeping and maintaining schedules, records for housekeeping duty.
- Carryout reporting and documentation of data/problems/incidents as applicable in a timely manner.
- Carrycot quality checks which includes inspection of instruments, equipment, tools, accessories etc and evaluating the need for action to ensure that problems do not recur
- Carryout problem identification and follow escalation matrix when required.

Exercise

1. India is the _____ largest producer of natural rubber in the world.
 - a) First
 - b) Second
 - c) Fifth
 - d) None of these
2. The two kinds of rubber available are _____ and _____.
 - a) Natural rubber and synthetic rubber
 - b) Natural rubber and plastic rubber

UNIT 3.1: Performing Compression Moulding Operation

Unit Objectives

At the end of the unit, you will be able to:

1. Hold the rubber compound appropriately and avoid any contamination.
2. Load the recognized material into the corrected pattern as according to SOP to diminish material wastage/ overflow/ excess.
3. Close the press appropriately and exert the pressure in a uniform manner.
4. Operate the press with intermediate pauses and release the pressure as according to SOP to make sure that air is extracted.
5. Make sure that moulding temperature and moulding pressure is preserved during the curing cycle.
6. Cure the product as according to SOP.

3.1.1 Operation

The rubber blank should be placed properly in the mould cavities/s and pressed slightly before closing the mould. This will ensure proper material flow within the cavity and avoid wastages due to material overflow and excess flash.

The press platen should be closed carefully keeping a close watch on the mould until the platen is completely closed. Check that the said pressure has been reached. The press should be bumped to evacuate entrapped air within the mould cavities. Close monitoring of the moulding pressure and temperature during the curing cycle is important to obtain uniform moulding quality. The vulcanizing conditions should be exactly as given in the SOP/work instruction.

The compression moulding process involves frequent closing and opening of the press followed by removal of the moulded products and loading of fresh blank. The same should be carried with care and as per the SOP. The operating parameters of the moulding press includes setting the specified hydraulic pressure, setting the number of bumps at the beginning of the cycle, besides of course time, temperature and pressure. The hydraulic pressure and bumping can vary from product to product depending upon the size, type of polymer used, hardness of the rubber compound etc.

The success of the moulding operation in terms of quality and productivity is very much dependent on the curing time, curing temperature and moulding pressure. It is very essential to keep rigid control on these parameters to obtain continuous product quality.

3.1.2 Influence Of Various Dimensions

The qualities of the rubber perform/blank in terms of dimensions, shape and viscosity will influence the moulding process significantly by way of mould flow characteristics. Every compression moulded products requires an optimum quality of perform/blank in shape and size: this is arrived at by trial and error during initial development of the product. Variations in perform quality will have serious impact on moulding quality.