

# “CONVERSION OF PUSH TO CONNECT MALE TUBE FITTING NIPPLE FROM METAL TO PLASTICS”

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## ABSTRACT

*This report covers the theoretical study of “PUSH TO CONNECT MALE TUBE FITTING NIPPLE FROM METAL TO PLASTIC” .the project works towards the number of problems encountered during use of metallic push to connect nipple .a novel creative approach will be introduced to overcome the problems occurred ,by using metallic push to connect male tube fitting nipple.*

*Before introducing any new means in the actual component first basic knowledge of working mechanism and its effects are converted in this project.*

*To overcome this problem plastic push to connect nipple is replaced by the actual metallic push to connect male tube fitting nipple with its detail design and manufacturing process ,to overcome the problem faced while working with replaced plastic nipple.*

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## ❖ REASONS OF REPLACEMENT IN PLASTICS

### PRIME FUNCTIONS.

- ✓ Reduction of cost.
- ✓ Corrosion resistance.

### SECONDARY FUNCTIONS.

- ✓ Light in weight.
- ✓ Equal durability as compared to metal.
- ✓ Easy to handle.
- ✓ Resistance to chemicals.
- ✓ Improved process ability

## 1. EXPERIMENTAL METHOD.

### 1.1. MATERIAL SELECTION FOR REPLACEMENT IN PLASTIC.

Material selection is main part of project, in this session of selection of materials there are total main total number of assembly in final product, here there is a main parts are main outer body, lock part, cap part & spring support.

For this project the materials are selected depends on its particular selection of property and as well as function of the part is reminded for selection of materials.

The materials are selected because of depending on its key properties are listed below with its parts are

**Body part :-** for main body part material is selected PPO (poly phenelne oxide), which is heaving a propertes like temp resrstnce, low thermal expansion, low water absorbation, excellent strength & good dimensional stability, self extinguishes, excellent mechanical strength, resistance to acid & bases etc.

**Cap part :-** for cap part material selected is PP ( poly propylene ),which is having a properties like good chemical resistance, good impact resistance, acid & solvent resistance, good hinge prop etc.

**Lock part :-**for cap part material selected is POM (poly oxy methelne ), it is heaving arop like good toughness, good creep res, excellent mechanical prop, good dimensional stability, good surface hardness, low moisture absorption, etc.

### 1.2 PRODUCT & MOULD DESIGN, & MOULD DEVELOPMET.

#### ▪ PRODUCT DESIGN CONCEPT .

If we design any product irrespective of the category it should have a definite shape & size with good operation and to reveal the function of the product Hence the primary concept involved in design is

- ✓ Shape
- ✓ size
- ✓ Asthetics
- ✓ Function

#### ▪ MOULD DESIGN CONCEPT

Design is the most important thing before manufacturing of the mould. First of all select the article and carefully understand each view of article and decide that which type of mould is suitable for selected article.

We decide the NIPPLLE as our article. According to design of our article injection mould is best for manufacturing for our product. we select a HAND type injection mould. . In the feed system of mould round runner and fan gate is used for proper filling of cavity. cooling is not given to the mould because of the trial purpose of production., so standard size pin and small diameter pin used in ejection system for eject the article. According to the volume of article and height of mould we decide that hand injection molding machine suitable for our mould.

**MOULDDEVELOPMENT :-** in the machining of mould parts are depends on design of the mould , there are different parts are available for the mould assembly, the machins are used depends on its application of operation ,there are using a lathe m/c, milling m/c, drilling m/c, grinding m/c, EDM m/c etc.

### 1.3 SELECTION OF PROCESSING METHODS & MACHINES.

#### ✓ vertical hnd injection moulding machine.

The simplest mode of injection moulding machine may be considered as hand mode, which is an apt equipment to understand the interaction of major operating parameters.

The machine consist of barrel, plunger, band heaters along with energy regulator, rack & pinion system for injection the material by plunger, a torpedo& nozzle.

The clamping is done manually on a working table. the machine is fitted on the working table. Heating is set manually. the capacity of the machine is available from 0.5 oz to 2 oz. sonce heating is archived the production starts manually.

The quality of product is completely depends on the skill of the operator. The heating set point is achieved by heat & trial mould. Although temperature controller may be fitted on machine, but the set point is completely depends on the quality of product produced by operator.

### 1.4 ASSEMBLY OF FINAL PRODUCT.

**Body part :-** Body part is main outer part of the whole assembly of article, there is an using a 20mm spanner & 8 mm Allen key is used to open or close the nipple. All the other parts are assembled in the body part.

**Lock part :-** Lock part is to fit in to a body part second top position, this part is to make a lock to close the assembly .

**Cap part :-** Cap part is given a pushing movement to the spring, which is first fitted in a lock part & then lock part is fitted in a main body part. Pipe is connected through the cap part to the whole assembly of nipple.

**Spring support :-** Spring support is located under the spring & lock part, it is place on the seal & it is become a spring movement for connect & remove the pipe every time.

**Seal :-** Seal is placed in the bottom of the whole assembly, & its function is to prevent leakage from the nipple.

**Spring :-** Spring is locatd over the spring support & under lock & cap part, the cap part is to create a pushing , spring works on its tension , the main function of the spring is to lock the pipe.



**Fig :- Final Product Assembly**

## 2 TEST RESULTS & DISCUSSION.

For related to the application wise the tests are conducted to ensure the main two types of test to check the product can with stand able to work for its general purpose applications.

The tests are

- (1) **LEAKAGE TEST.**
- (2) **PRESSURE TEST.**

### (1) LEAKAGE TEST.

This test is carried out in a pressurised water, there is a connected a pressure gauge to show the pressure, the pressurised water is circulating in the connecting pipes.

The pressure of the water is measured under 30 psi to sustain the load & pressure of the water, the nipple is connected with the pipes of the manifold & check the leakage under the test condition under 30 psi pressure of water for 10 hrs.

Result

A metal to plastic replaced plastic nipple is having a good load bearing & leakage proof capacity under the test condition 30 psi water pressure for 10 hrs without leakage.

### (2) PRESSURE TEST.

This test is carried out in a pressurised AIR in a connecting medium of the test, there is a connected a pressure gauge to show the pressure, the pressurised air is circulating in the connecting pipes.

The pressure of the water is measured under 4 to 6 bar of air pressure to sustain the load & pressure of the air, the nipple is connected with the FRL unit (filter, regulator, lubricator) to check the leakage under the test condition under 4 to 6 bar pressure of air for 10 hrs.



Figure:- Pressure Testing & Leakage Testing Of Product On FRL Unit.

**Result .**

A metal to plastic replaced plastic nipple is having a good load bearing & leakage proof capacity under the test condition 4 to 6 bar air pressure for 10 hrs without leakage.

**3 CONCLUSION.**

In metallic push to connect male tube fitting nipple have during in its long time working condition, number of problem occurs in it.

After studying and working on its operations and materials, the solution has been found to overcome its limitations.

As compared to metallic nipple, plastic nipple is also sustain the pressure of air & as well as water, in a final resulting it can carry load up to 4-6 bar pressure of air without any kind of leakage.

It has a conversion in plastics there are many advantageous over the metallic nipple, these are corrosion resistance, cost effective, easy to handle, light in weight, good process ability, etc.

The cost of plastic nipple is 40 % lower than the metallic nipple, so by using replacing with it in plastic push to connect male tube fitting nipple, the problems can be eliminated and the same outcome can be obtained as in metallic "push to connect male tube fitting nipple".

So the use of plastic push to connect nipple is cheap, & easy solution to increase the efficiency.

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