

FOOT REFORMER MACHINE

Aim: To give cylindrical shape to the open top sanitary collapsed can body with two ends and measure the power transmission elements of a foot reformer machine.

Apparatus:

1. Open top sanitary collapsed can body with two ends.
2. Tachometer
3. Outside caliper
4. Measuring scale
5. Thread (Nylon)

Working principle:

It is equipment used to reform the body of open top collapsed body can with two ends. The machine has a simple mechanism and a compact structure. In its simple mechanism the power from the electrical motor is transmitted to the driven pulley by means of 'V' belt and from the driven pulley the power is transmitted to the two rollers (i.e. bigger and smaller) by spur gears. Now the two rollers will start to rotate in opposite direction to give the required cylindrical shape to the collapsed can body having two ends. Nearly 30 to 40 cylindrical shaped cans may be reformed per minute using the machine.

The machine is essentially consists of following parts:

- Electrical motor Shaft, bearing
- Driver and Driven pulleys Spur gears
- 'V' belt. Bigger smaller rollers

Procedure:

- After observing the condition of the machine, if necessary greasing, oiling may be done and the rollers should be cleaned of oil, grease and dirt with a cotton waste.
- Switch on the starting button.
- Insert open top sanitary can collapsed body with two ends in between the two rollers.
- Press the foot pedal firmly and hold the can body at the bottom properly, without rolling the fingers.
- Release the foot pedal after getting the correct reformed shape of the can body.
- The reformed can body is taken away for the next operation.
- Switch off the machine once all the operation is over.

Precautions:

- During the rolling operation care should be taken to see that the operating fingers don't get rolled between rollers.
- It is better to wear half sleeve shirts.

Observations: Following observations have to be recorded

Sl.No.	Parameters	
1.	Horse power of the motor (HP/KW)	
2.	Speed of the motor(rpm)	
3.	Diameter of the driver pulley (cm)	

4.	Diameter of the driven pulley (cm)	
5.	Center distance between the driver and driven pulleys(cm)	
6.	Speed of the driver pulley	
7.	Speed of the driven pulley	
8.	Type of gears used	
9.	No. of gears used	
10.	No. of teeth on each gear	
11.	Diameter of the bigger roller	
12.	Diameter of the smaller roller	
13.	Length of the bigger roller	
14.	Length of the smaller roller	
15.	Length of the belt	
16.	Type of belt	
17.	Type of belt drive system	

Calculations:

1) Velocity ratio of belt drive

$$\frac{N_2}{N_1} = \frac{d_1}{d_2}$$

Where,

N_1 = Speed of the driver in rpm

N_2 = Speed of the driven in rpm

d_1 = Diameter of the driver in cm

d_2 = Diameter of the driven in cm

2) Length of the belt

$$L = \pi(r_1 + r_2) + 2x + \frac{(r_1 - r_2)^2}{x}$$

Where,

r_1 = radius of the driver pulley in cms

r_2 = radius of the driven pulley in cms

x = distance between the center of the pulley in cms

$$2 \pi NT$$

$$\text{HP} = \frac{\text{-----}}{4500}$$

3) Diameter of the shaft

$$T = \frac{\pi}{16} f_s d^3$$

Where,

f_s = Shear stress in Kg/cm²

T = Torque in Kg-m

N = rpm

HP = Horse power

d = Diameter of driver shaft in cms