Gearing Ratio: 14:44 18:37

shaft diamater: ~17.5 mm

flow = $20mm^3/s$

Fillament diameter: 1.75mm

?9.8mm/s speed?

```
In [55]:   from math import pi
           # specs
           gear_ratio = (14/44)*(18/37)
           shaft_dia = 17.5
           #added a little extra flow to have a buffer in motor rpm (it is nice that
           flow = 20*2
           fil_dia = 1.75

           #requirements
           torque = 850 #Nmm (Newton milimeter)
```

Lets start by calculating the needed extrusion speed

```
In [52]:   #extruder_speed
           ext_speed = flow/(pi*(fil_dia/2)**2)
           #extruder angular velocity
           ext_ang_vel = (ext_speed*60) /(pi*shaft_dia)
           motor_ang_vel = ext_ang_vel*(1/gear_ratio)
           motor_ang_vel
```

Out[52]:   117.2495545307506

Lets calculate extrusion torque

```
In [56]:   max_motor_trq = torque*gear_ratio
           max_motor_trq
```

Out[56]:   131.57248157248156