

## Ideal Experimental Setup

### Input Variables:

- Relative Humidity (%rH) [To be controlled with humidifier and calculated with Hygrometer]
  - 40    50    60    70    80
- Moisture Absorption rate ( $M\%$ ) [To be calculated]
  - $M_i$  (From Datasheet)  
 $M_i$      $M_i$      $M_i$      $M_i$      $M_i$     //constant; material property
  - $M_t$  (To be calculated after exposing the material to the level of humidity for min 12hrs)  
 $M_{t40}$      $M_{t50}$      $M_{t60}$      $M_{t70}$      $M_{t80}$

### Output Variables:

- Max Output (from the machine)
  - $M_{o40}$      $M_{o50}$      $M_{o60}$      $M_{o70}$      $M_{o80}$
- Output (from the machine)
  - $O_{40}$      $O_{50}$      $O_{60}$      $O_{70}$      $O_{80}$
- Quantity (from the machine)
  - $Q_{40}$      $Q_{50}$      $Q_{60}$      $Q_{70}$      $Q_{80}$

### Constant Variables:

- Temperature
- Duration of each trial
- Speed of the shaft in each trial

The above-mentioned variables are considered for the experiment on each individual material and are repeated for two more different materials. And all the data from all three materials are used for training the model for testing on a 4<sup>th</sup> random material.

### List of parameters to be recorded before the start of the test:

- Humidity (%rH)
- Moisture absorption rate (%)
- Temperature (°C)
- Speed of the shaft (%rpm)
- Duration of the trial (s)

The results of the experimental setup:

- Maximum Output (kg/h)
- Output (kg/h)
- Quantity (g)

Constants

Temperature: 20°C approx

Duration of each trial: 900 secs

Speed of the shaft in each trial: 60%

Material	%rH	M <sub>i</sub> (g)	M <sub>t</sub> (g)	M <sub>%</sub>	Max. Output (kg/h)	Output (kg/h)	Quantity (g)
HDPE	40						
HDPE	50						
HDPE	60						
HDPE	70						
HDPE	80						
Material	%rH	M <sub>i</sub> (g)	M <sub>t</sub> (g)	M <sub>%</sub>	Max. Output (kg/h)	Output (kg/h)	Quantity (g)
PU	40						
PU	50						
PU	60						
PU	70						
PU	80						
Material	%rH	M <sub>i</sub> (g)	M <sub>t</sub> (g)	M <sub>%</sub>	Max. Output (kg/h)	Output (kg/h)	Quantity (g)
PC	40						
PC	50						
PC	60						
PC	70						
PC	80						

M<sub>i</sub> (g) : Initial mass of the specimen after drying

M<sub>t</sub> (g) : Mass of the specimen at the given time interval

Moisture absorption rate(M<sub>%</sub>) = (M<sub>t</sub> - M<sub>i</sub>) / (M<sub>i</sub> × 100)