

Diploma in Packaging Technology

Filling Equipment

Overview

- Weights and Measures
- Liquid fillers
- Paste fillers
- Solis fillers

Weights & Measures

- Average and Minimum Fill systems
- Packers rules
 - Average weight not less than stated weight
 - No more than 2.5% underweight by TNE (T1)
 - No packs underweight by more than twice TNE (T2)
- Appropriate measurement equipment



TNE

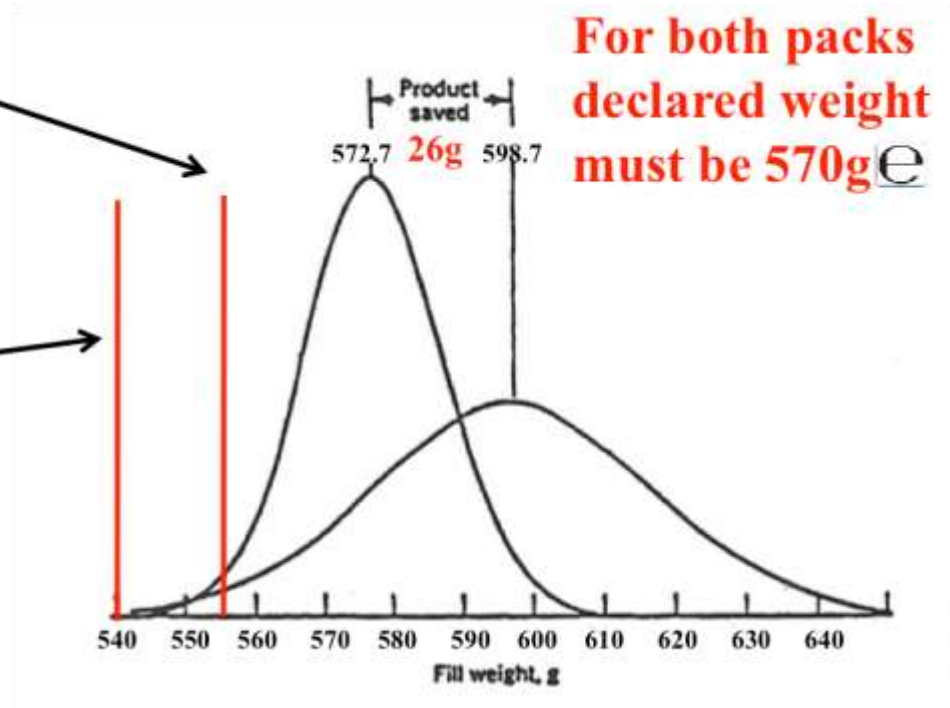
Table of Tolerable Negative Errors

Nominal Quantity (Q_n) in g or ml		Tolerable Negative Error	
From	To	% of Q_n	g or ml
5	50	9	
50	100		4.5
100	200	4.5	
200	300		9
300	500	3	
500	1000		15
1000	10000	1.5	
10000	15000		150
Above 15000		1	

Declared Weights

T1 – Not more than 2.5% of packs can be underweight by more than 15g (i.e. 555g)

T2 – No pack can be underweight by more than 30g (i.e. 540g)



Product

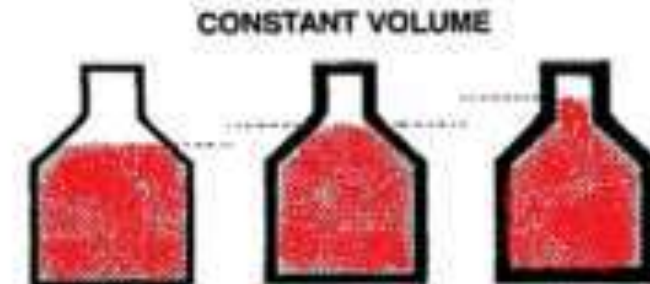
- Physical format
 - Solid liquid paste
- Fragility
- Hygiene
- Safety

Liquid & Paste filling

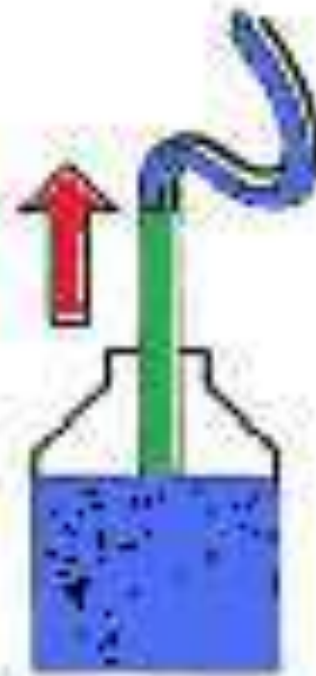
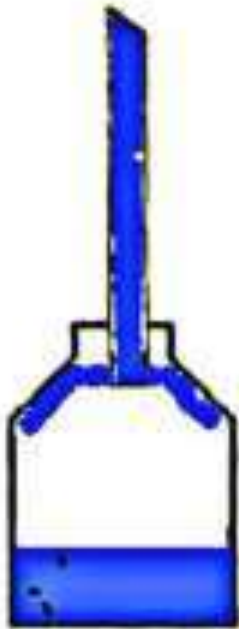
- Viscosity
- Foaming
- Oxidation
- CO₂ loss
- Shear resistance

Liquid Fillers

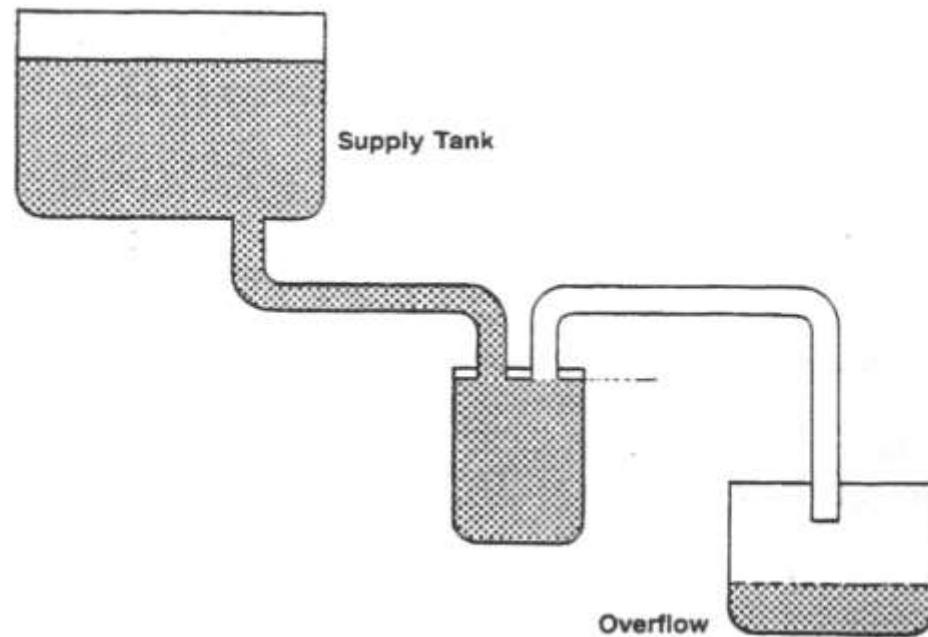
- Constant Level
- Constant Volume



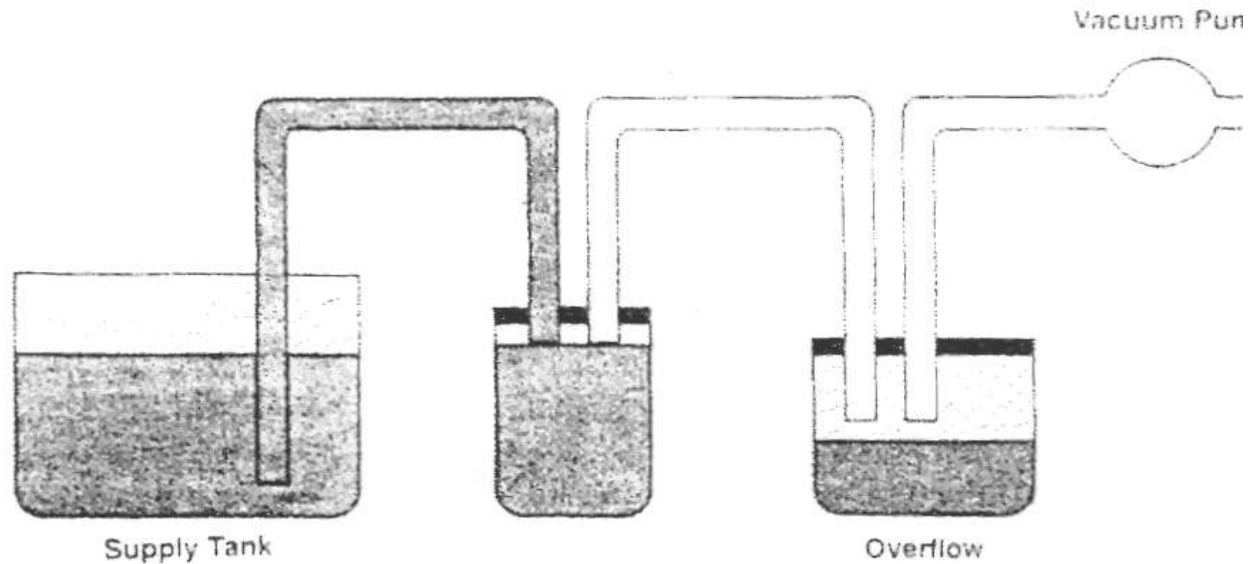
Top to bottom filling and bottom up filling



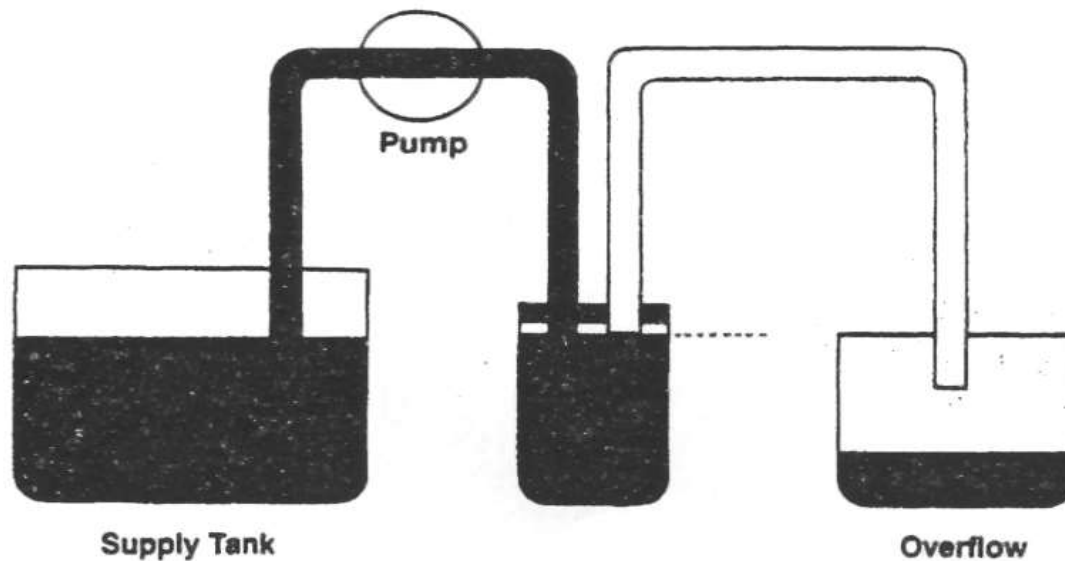
Gravity Fillers



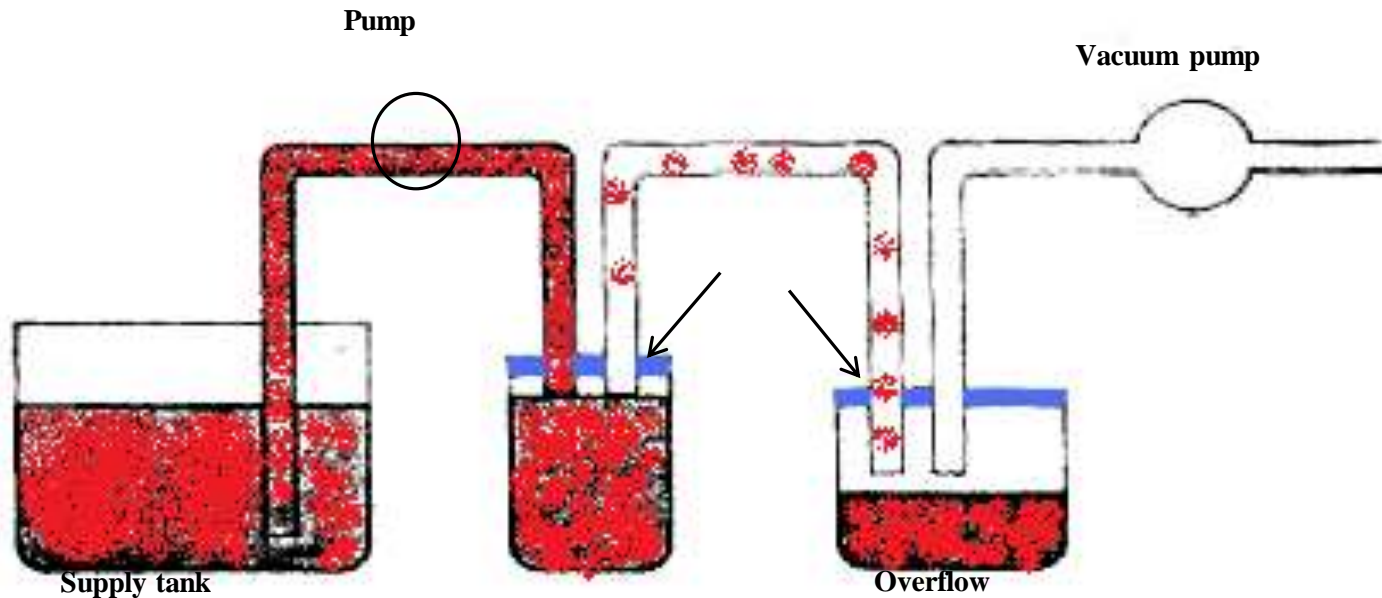
Vacuum Fillers



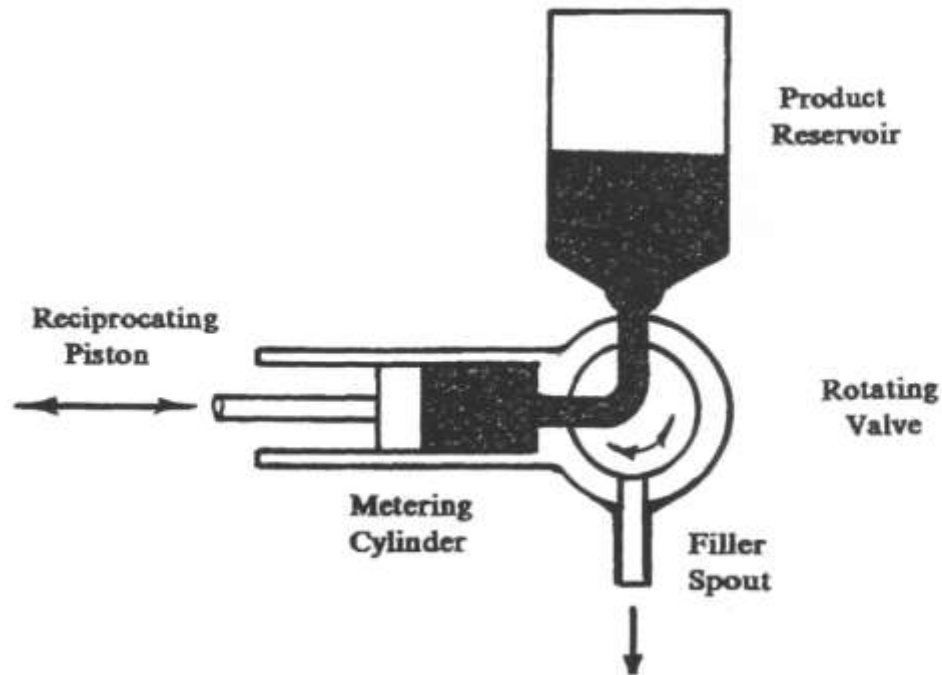
Pressure Fillers



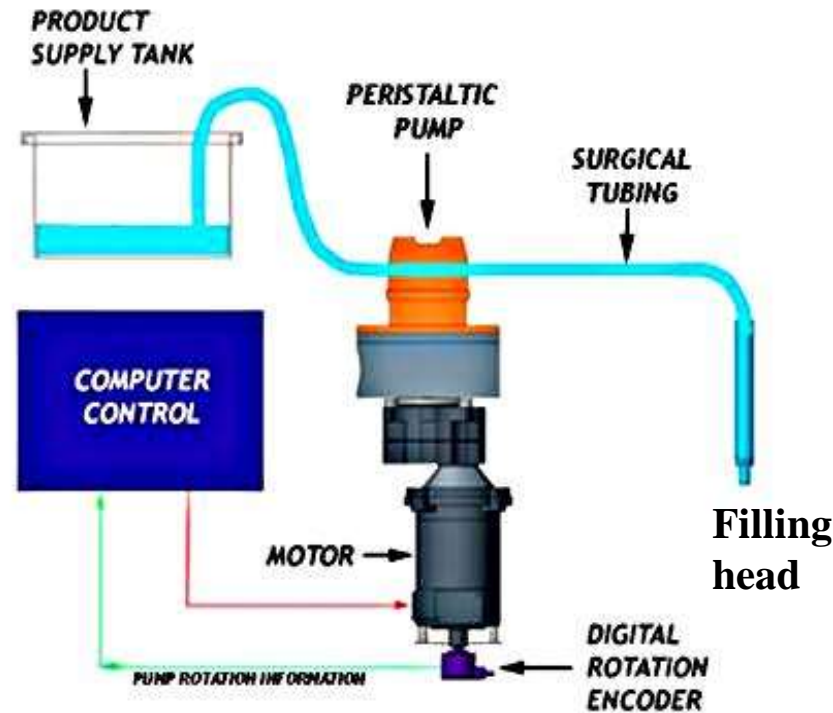
Pressure and Gravity Fillers



Piston Fillers

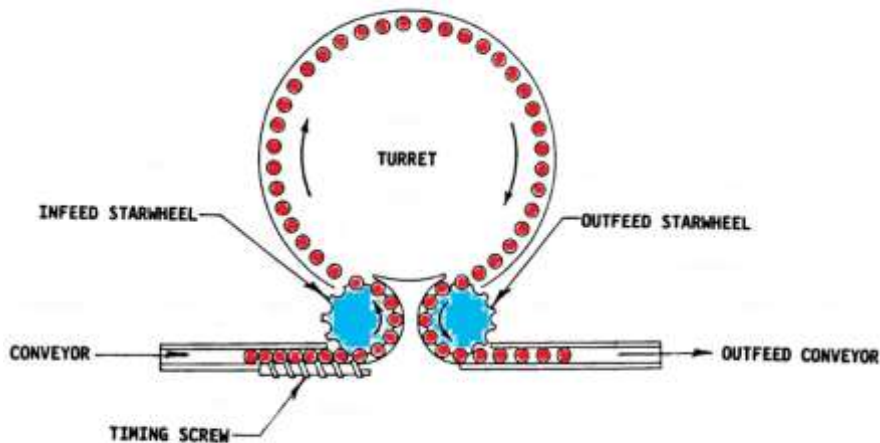


Metering Pump



Rotary or In Line Fillers

- Rotary 500-2000cpm



Liquid fillers

- Excess product removal
 - Require good seals
- Level detection
 - Sonic

Recap Package Characteristics

- Glass Jar / Bottle
- Plastic bottle
- Liquid paperboard carton
- Can

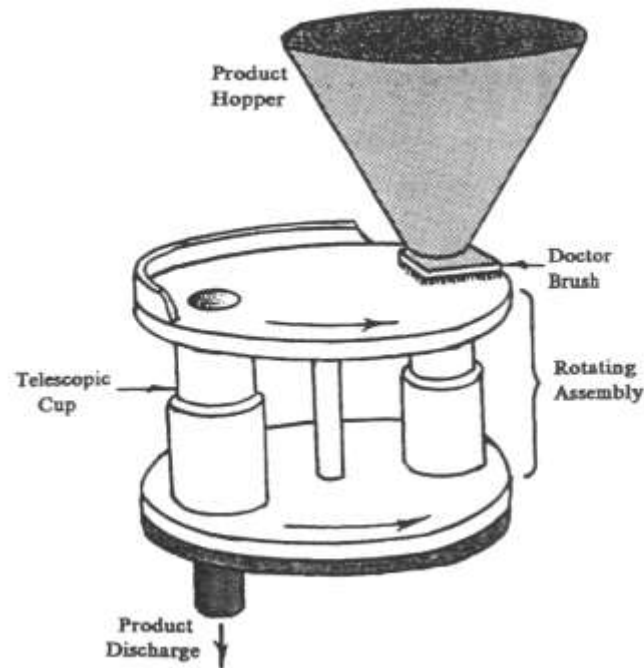
Fillers need to think about :

- Product characterises
- Package characteristics
- Filler type

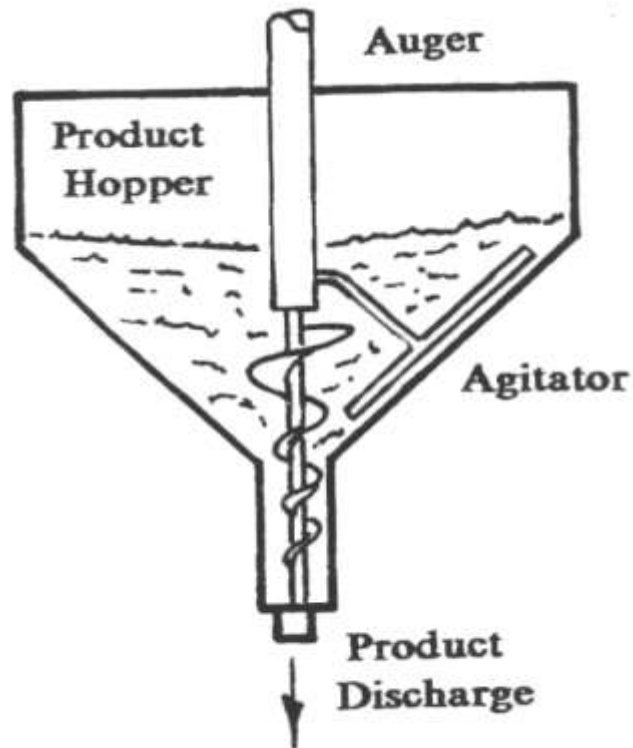
Dry Filling

1. Volume, cup auger fillers
 - Density impact.
2. Weight, weighting systems
3. Count

Cup Filler: 1. Volume



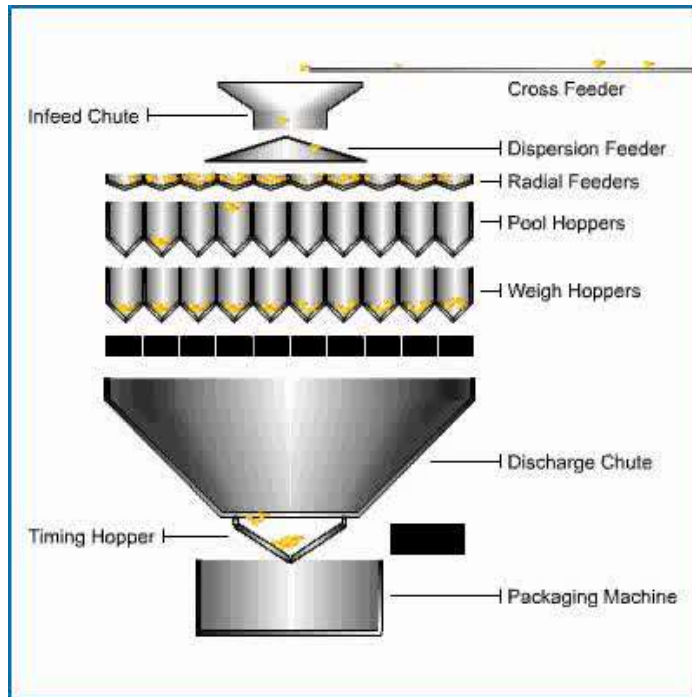
Auger Filler: 1. Volume



Solids filling

- Single filler
 - Rotation
 - Scale
- Drop and top up
 - 90% quick drop
 - Topped up

2. Weight Systems



<https://www.youtube.com/watch?v=kfBp2Vz0SRU>

3. Counting Systems

- Counts individual items
 - Electronic eyes, disks,
-
- <https://www.youtube.com/watch?v=be3ugunC0H4>
 - <https://www.youtube.com/watch?v=XKUiaNWFk3w>
 - <https://www.youtube.com/watch?v=NnWRQpuPT7o>