D.III.i.2.2

Analysis of granules' flowability

Introduction/ Object: flow property of solid grain aggregation is an important characteristic of material. It strongly depends on grain-size distribution, humidity, formal and surface property of grain, electrostatic charge, etc.

Performing the practice:

1**:** Measure 100.0 g sample.
2: Put the ASTM – funnel in such a way, that the orifice 4.0 cm from the desk.
3: Block the orifice of the funnel with a spatula.
4: Snatch the spatula, run off the material. Do at least five parallel measurements! Measure the flow time.
5: Measure the sample homogenised with flow enhancer excipients. Do the analysis in conformity with 2-4 points.

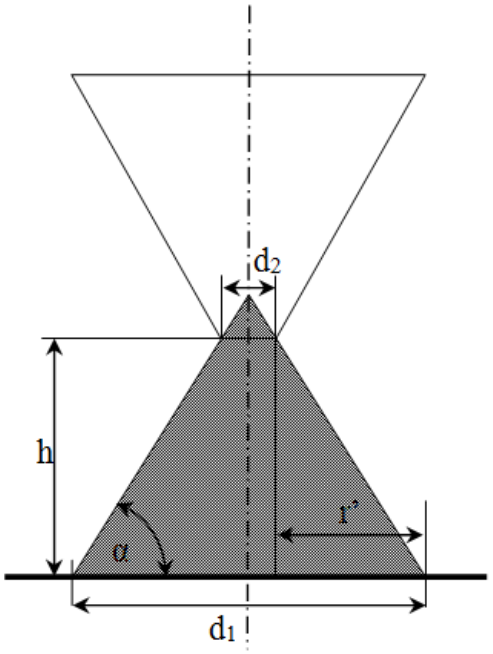
Assessment:

Calculate the angle of repose, the mass flow (g/s) of powder/granule, and the volumetric flow rate (ml/s) of powder/granule!

h= altitude of aggregate (mm)
r'= half line of aggragate (mm)
d_1= diameter of aggragate
d_2= inner diameter of discharge hole of funnel (mm) {10mm}

$$tg\alpha = \frac{h}{r'}$$

$$r' = \frac{d_1 - d_2}{2}$$



University of Pécs Institute of Pharmaceutical Technology and Biopharmacy Laboratory education	Pages: 1/1 Practice number: **D.III.i.2.2**
Task: Granule flowability analysis	
Group:	Responsible for the worksheet:
Practice supervisor:	Date:

Aim of practice:

Purity and quality of tools:

Tools	*Qualification*		*Controller's signature*
	Appropriate	*Inappropriate*	
ASTM funnel			
plastic card			
measuring tube			
stop-watch			

Measuring: 100.0 g granules ……..

Measuring	Flow time (s)	weight of heap (g)	volume of heap (ml)	angle of repose (°)
1.		100		
2.		100		
3.		100		
4.		100		
5.		100		

Measuring: 100.0 g granules …… + …… glidant

Measuring	Flow time (s)	weight of heap (g)	volume of heap (ml)	angle of repose (°)
1.		100		
2.		100		
3.		100		
4.		100		
5.		100		

Assessment:

Calculate the mass flow (g/s), the volumetric flow rate (ml/s), the average angle of gradient and the efflux time of powder/granule.

D.III.i.4.1

Powder-rheological analysis

Apparent volume

Introduction/Object

Performing the practice:

1: Measure 50.0 g of the sample.
2: Put it in the measuring cylinder with one movement.
3: Fix the measuring cylinder to the Erweka volumetric apparatus.
4: Set the tap number.
5: Read off the volume.
6: Discharge the sample and clean the measuring cylinder.

Assessment:

Calculate the rates of density and compactibility.
Illustrate on a diagram the volume, the density and the tap number (density and volume on y-axis/tap number on x-axis).
Calculate the value of the Hausner-factor and the Carr-index:

$$Hf = \frac{\rho_T}{\rho t}$$

$$Carr - index = \frac{\rho_T - \rho_t}{\rho_T} \cdot 100$$

ρ_T = tapped density

ρ_t = filled (bulk) density

According to the literature the flowability of the sample is:

Hausner-factor:

Carr-index:

University of Pécs Institute of Pharmaceutical Technology and Biopharmacy Laboratory education	Pages: 1/1 Practice number: **D.III.i.4.1**
Task: **Analysis of apparent volume**	
Group:	Responsible for worksheet:
Practice supervisor:	Date:

Purity and quality of tools:

Tools:	*Qualification*		*Controller's signature*
	Appropriate	*Inappropriate*	
ERWEKA SVM 102			
Patendula			

Measuring: measurand **50.0 g …….. + external phase of tablet**

Impact number	Volume (V) [ml]	Density [g/ml]	Compactibility (V_n-V_{n+1}) [ml]	Hf factor	Carr-index
0					
10					
20					
30					
40					
50					
100					
150					
200					
250					
500					
750					
1000					
1010					
1020					
1030					
1040					
1050					
1100					
1150					
1200					
1250					

$$Hf = \frac{\rho_T}{\rho_t} \qquad Carr - index = \frac{\rho_T - \rho_t}{\rho_T} \cdot 100$$

ρ_T = tapped density
ρ_t = filled (bulk) density

Assessment:

Illustrate on a diagram the volume, the density and the impact number of function (density and volume on y-axis/ impact number on x-axis).

Calculate the value of the Hausner-factor and the Carr-index!