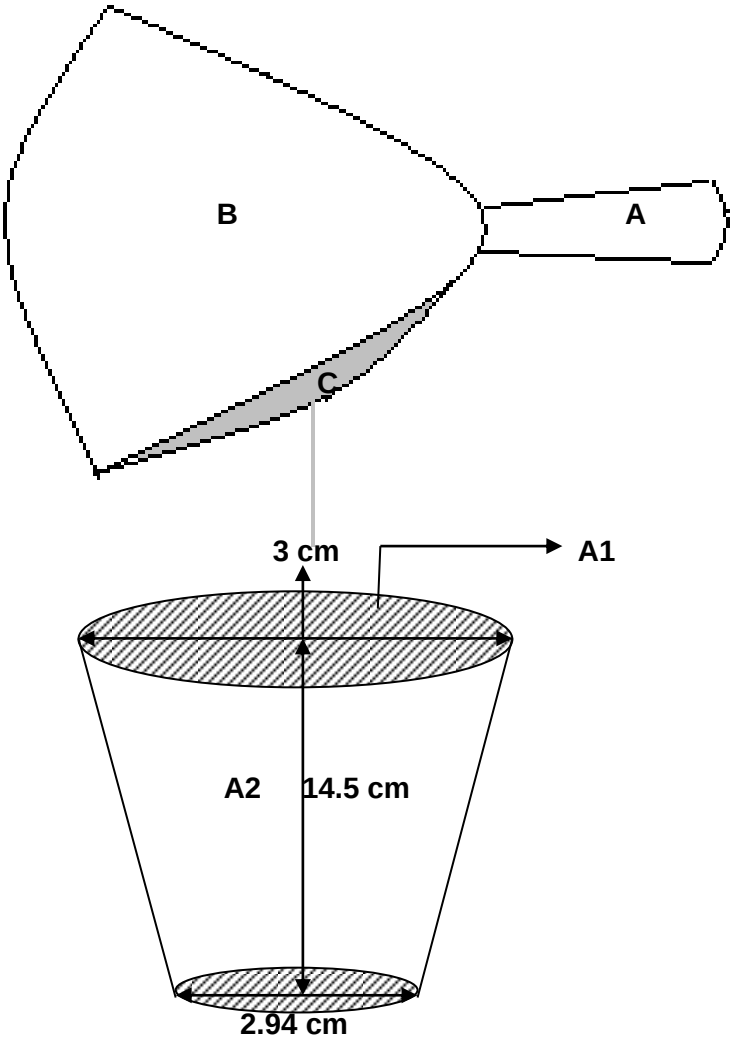
# DISPENSING SCOOP



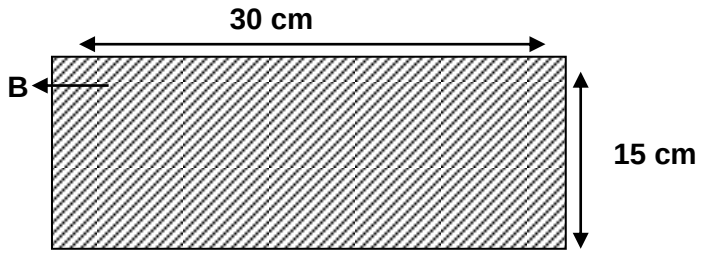

A = A1+A2

A1 = $\pi r^2$
= 3.14 x $1.5^2$
= 7.065

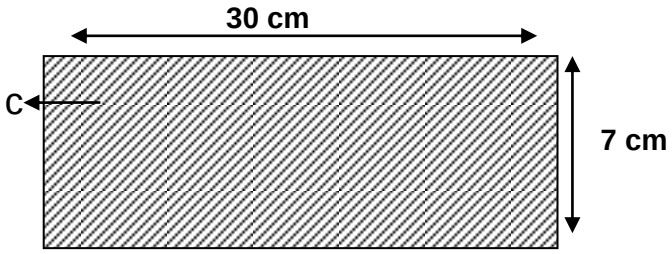
A2 = $\pi$ x (r1+r2) x $(h^2+ (r1-r2)^2)^{1/2}$
= 3.14 x (1.5+1.47) x $(14.5^2+ (1.5-1.47)^2)^{1/2}$
= 1961.01

A= A1+A2
= 7.065+1961.01

= 1968.1




B = l x b (1 inner +1 outer surface)
= 30x15
= 450 x 2
= 900

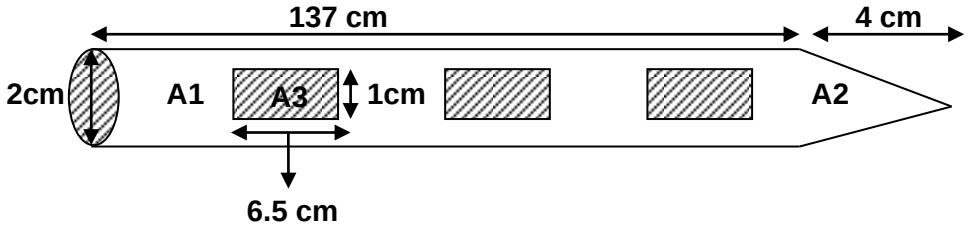



C = l x b (2 inner + 2 outer surfaces)
=30 x 7
= 210
=210 x 4
=840

Dispensing Scoop = A+B+C
= 1968.1+900+840
= 3708.1 $cm^2$

# SAMPLING THIEF

Outer cover:



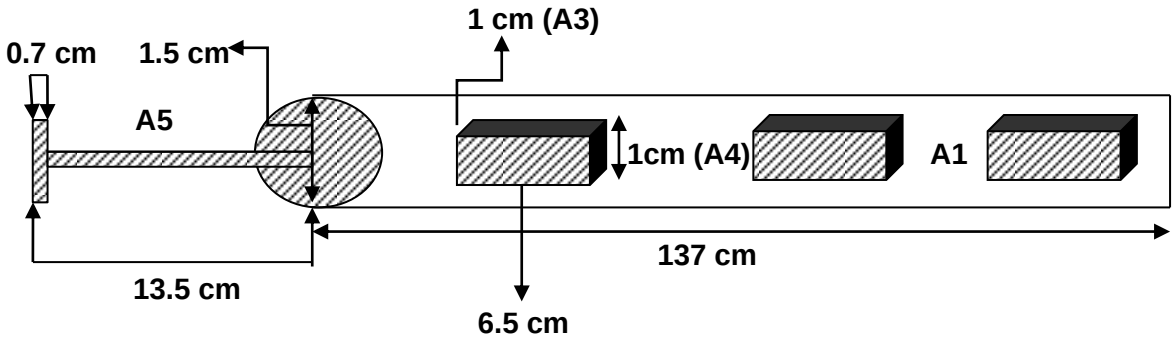

A1 = 2πrh
= 2 x 3.14 x 1 x 137
= 860.36

A2 = π x r x $(r^2+h^2)^{1/2}$
= 3.14 x 1 x $(1^2+ 4^2)^{1/2}$
= 12.94

A3 = l x b (3 no.s)
= 6.5 x 1
= 6.5
= 6.5 x 3
= 19.5

A = A1+A2-A3
= 860.36+12.94-19.5
= 853.8

Inner rod:




A1 = 2πr(r+h)
= 2 x 3.14 x 0.75 (0.75+137)
= 648.80

A2 = l x b (3 no.s)
= 6.5 x 1
= 6.5 x 3

= 19.5

A3 = l x b (2 parallel side surfaces x 3 no.s)

= 6.5 x 1

= 6.5

= 6.5 x 2 x 3

= 39

A4 = l x b (2 parallel side surfaces x 3 no.s)

= 1 x 1

= 1

= 1 x 2 x 3 = 6

A5 = 2πr(r+h)

= 2 x 3.14 x 0.35(0.35+13.5)

= 30.44

A=A1- (A2+A3+A4) + A5

= 648.80 - (19.5+39+6) +30.44

= 614.77

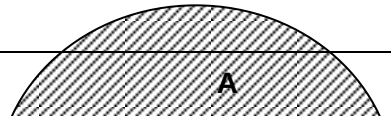
Sampling Rod = A + A

= 853.8 + 614.77

= 1468.57 $cm^2$

## INTERMEDIATE PROCESS CONTAINER

Cover:



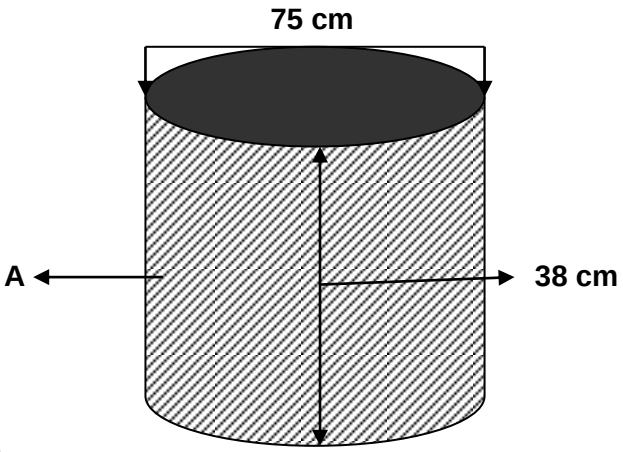
75 cm

$A = \pi r^2$

$= 3.14 \times 37.5^2$

$= 4415.63$

Upper Portion:

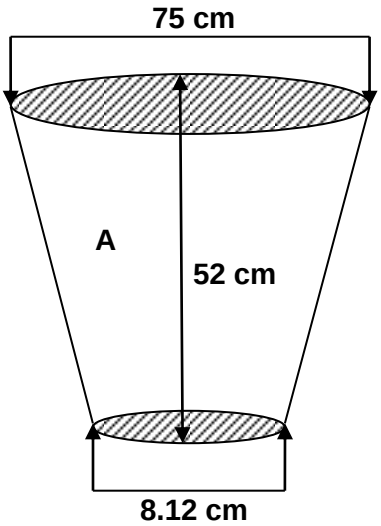


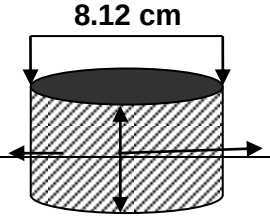

$A = 2\pi rh$

$= 2 \times 3.14 \times 37.5 \times 38$

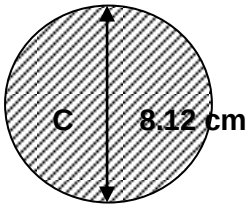
$= 8949$

Lower portion:



**B** **14 cm** **14 cm**




$A = \pi \times (r1+r2) \times (h^2 + (r1-r2)^2)^{1/2}$
$= 3.14 \times (37.5+4.06) \times (52^2 + (37.5 - 4.06)^2)^{1/2}$
$= 8067.93$

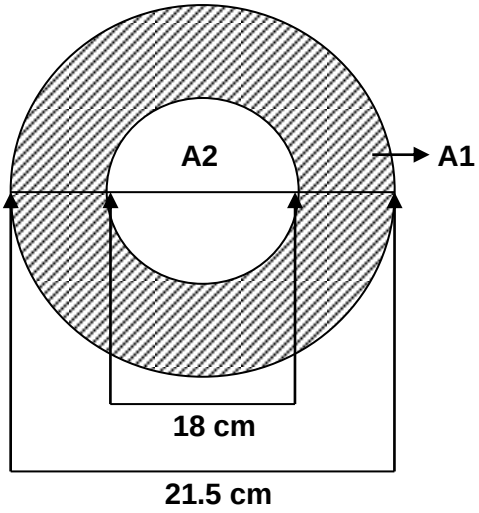
$B = 2\pi rh$
$= 2 \times 3.14 \times 4.06 \times 14$
$= 356.95$

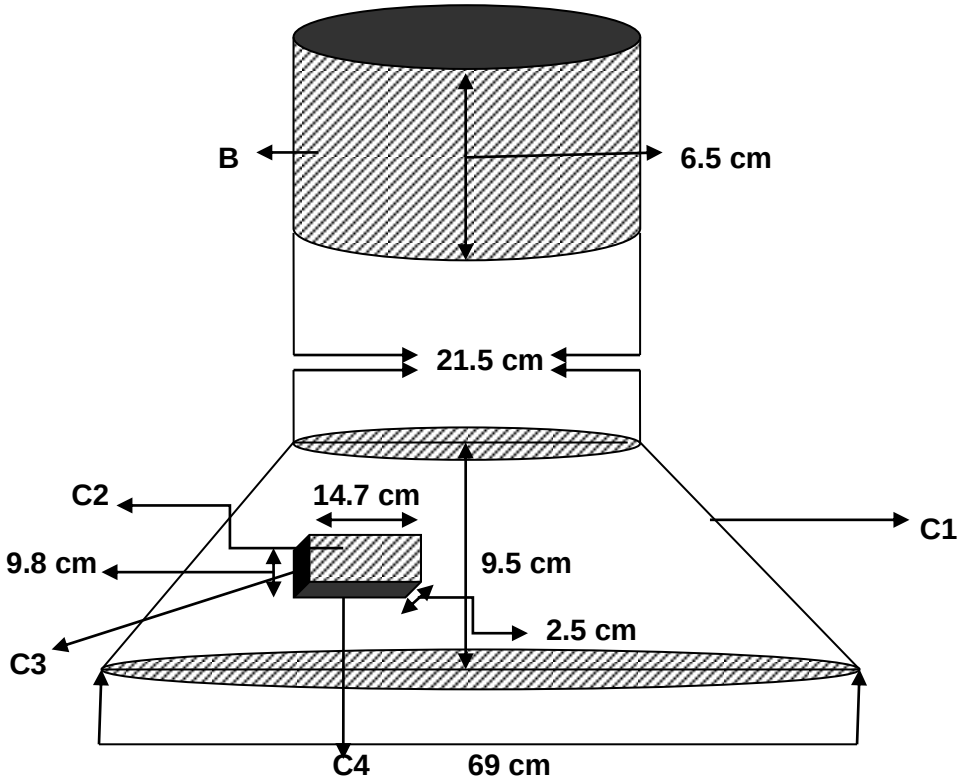
$C = \pi r^2$ (2 surfaces (upper and lower))
$= 3.14 \times 4.06^2$
$= 51.758$
$= 51.758 \times 2$
$= 103.51$

IPC = A + A + A + B + C
= 4415.625 + 8949 + 8067.93 + 356.95 + 103.51
= 21893.02 $cm^2$

## VIBRO SIFTER

Upper Hopper:




A = A1-A2

$A1 = \pi r^2$

$= 3.14 \times 10.75^2$

= 362.87

$A2 = \pi r^2$

$= 3.14 \times 9^2$

= 254.34

A = A1-A2

= 362.87-254.34

= 108.53

B = 2πrh

= 2 x 3.14 x 10.75 x 6.5

= 438.82

C = C1+C2+C3+C4

$C1 = \pi \times (r1+r2) \times (h^2 + (r1-r2)^2)^{1/2}$

$= 3.14 \times (34.5+10.75) \times (9.5^2 + (34.5-10.75)^2)^{1/2}$

= 3634.53

C2 = l x b

= 14.7 x 9.8

= 144.06

C3 = l x b (2 parallel side surfaces)

= 9.8 x 2.5

= 24.5

= 24.5 x 2

= 49

C4 = l x b (2 parallel side surfaces)

= 14.7 x 2.5

= 36.75

= 36.75 x 2

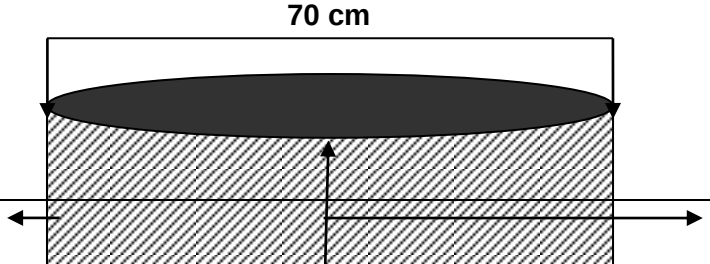
= 73.5

C = C1+C2+C3+C4

= 3634.53+144.06+49+73.5

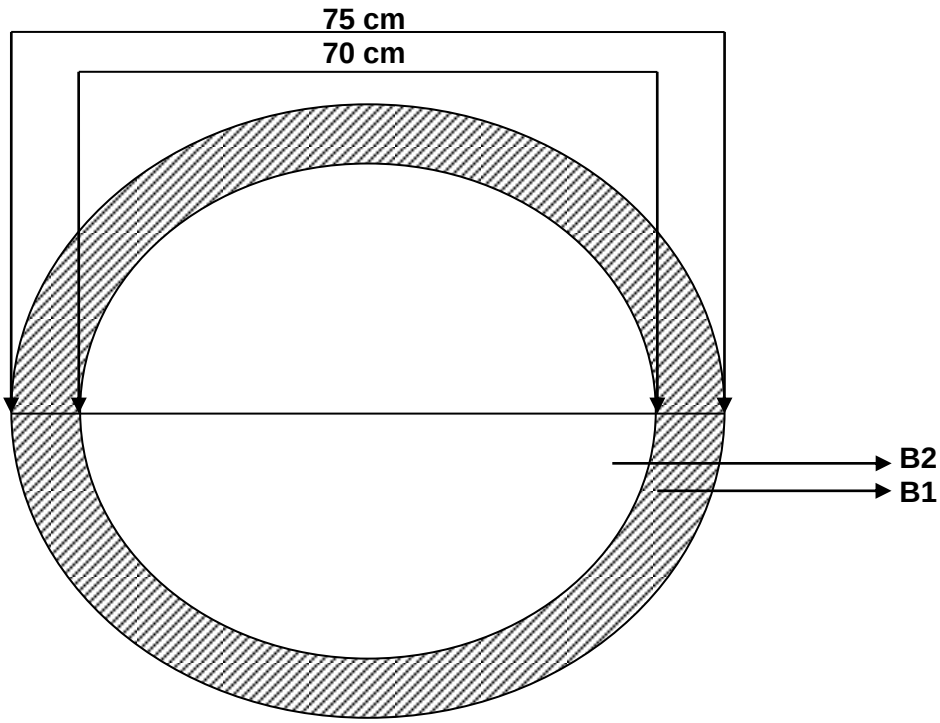
= 3901.09

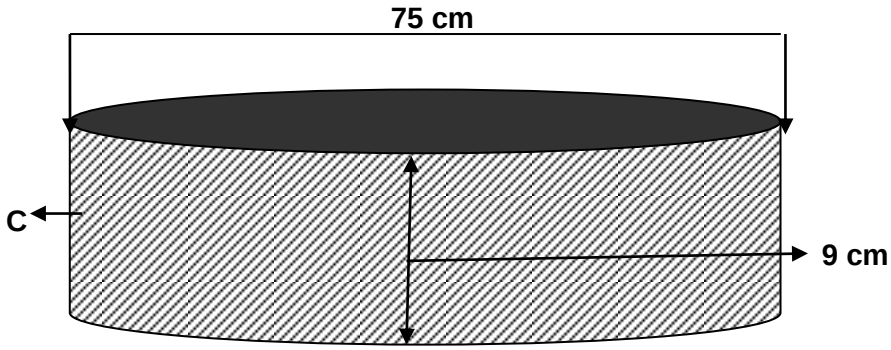
Middle Hopper:

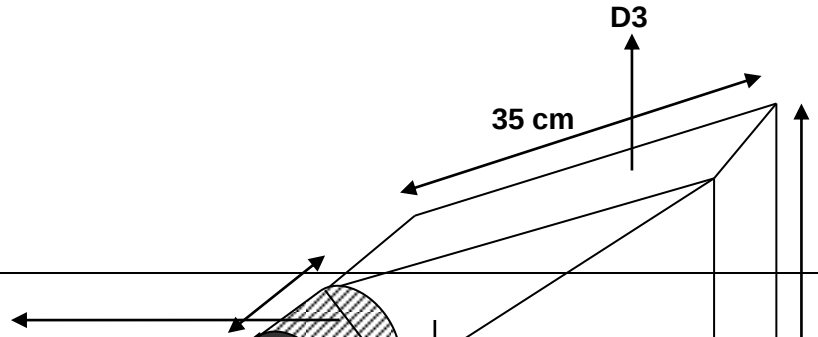


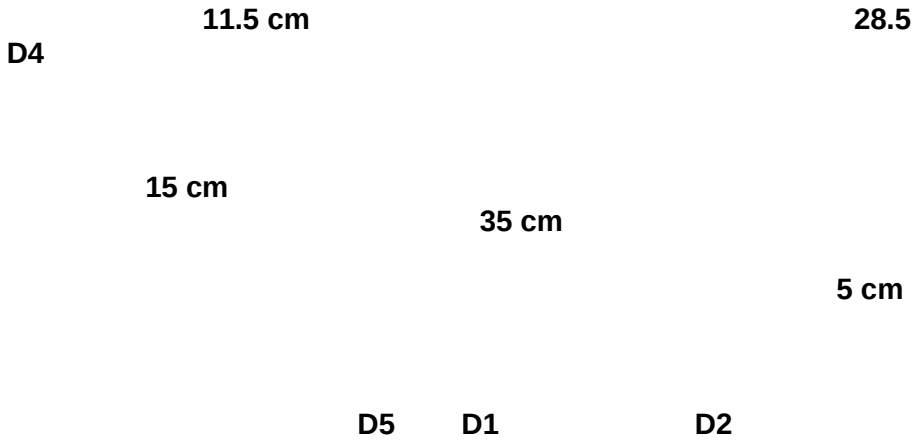
A

5 cm






A = 2πrh
= 2 x 3.14 x 35 x 5
= 1099

B = B1 - B2

B1 = $\pi r^2$
= 3.14 x $37.5^2$
= 4415.63

B2 = $\pi r^2$
= 3.14 x $35^2$
= 3846.5

B = B1 - B2
= 4415.63 - 3846.5
= 569.13

**c** = 2πrh
= 2 x 3.14 x 37.5 x 9
= 2119.5

D = D1+D2+D3+D4+D5-D6

D1 = 1/2absin(c)
= 0.5 x 35 x 15 x sin (15/35)
= 110.25

D2 = 1/2absin(c) (2 opposite sides)
= 0.5 x 35 x 28.5 x sin (28.5/35)
= 364.09
= 364.09 x 2
= 728.18

D3 = l x b (2 opposite sides)
= 35 x 5
= 175
= 175 x 2
= 350

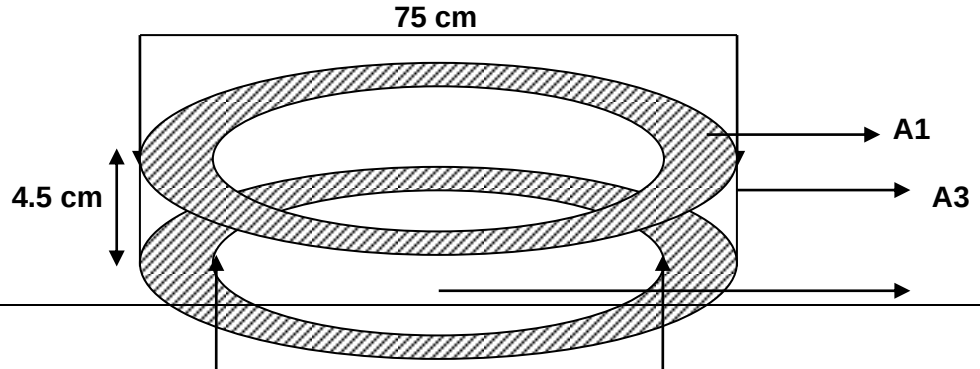
D4 = l x b
= 15 x 5
= 75

D5 = 2πrh
= 2 x 3.14 x 7.5 x 11.5
= 541.65

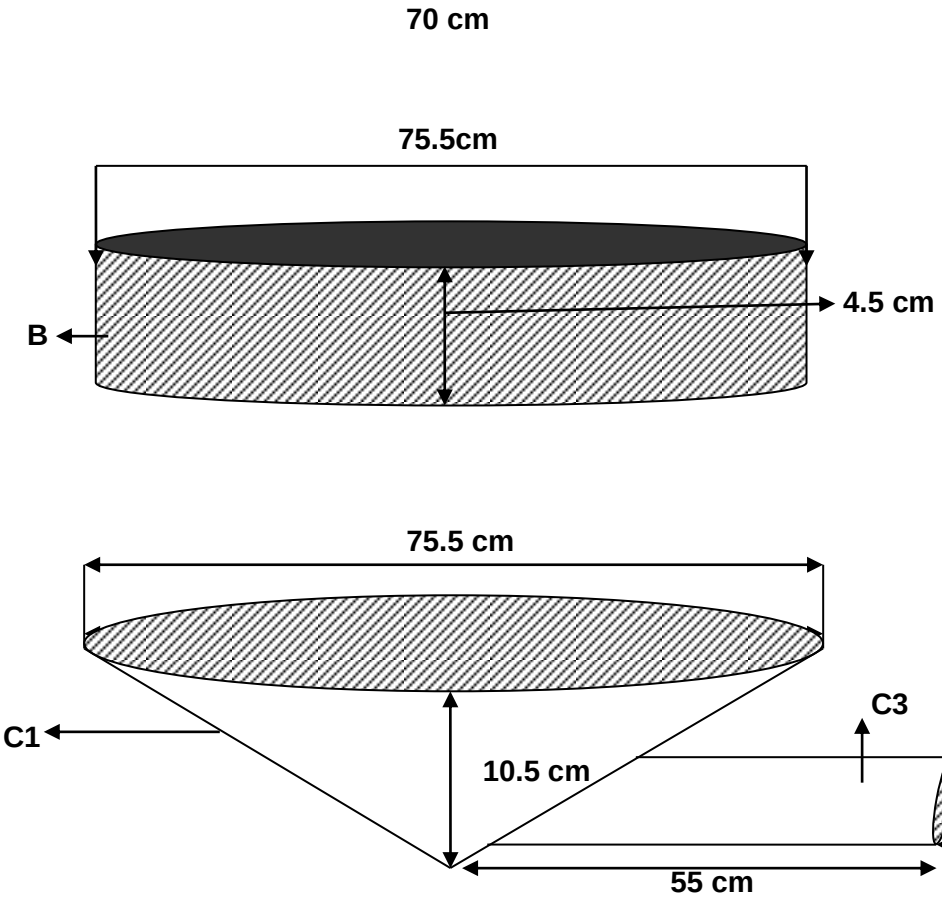
D6 = $\pi r^2$
= 3.14 x $7.5^2$
=176.625

D = D1+D2+D3+D4+D5-D6
= 110.25+728.18+350+75+541.65-176.625
= 1628.4

Lower Hopper:



**A2**




A = A1 - A2 + A3

A1 = $\pi r^2$
= 3.14 x $37.5^2$
= 4415.625

A2 = $\pi r^2$
= 3.14 x $35^2$
= 3846.5

A3 = $2\pi rh$
= 2 x 3.14 x 37.5 x 4.5
= 1059.5

A = A1 - A2 + A3
= 4415.625 - 3846.5 + 1059.5
= 1628.63

B = 2πrh
= 2 x 3.14 x 37.75 x 4.5
= 1066.82

C = C1- C2 + C3

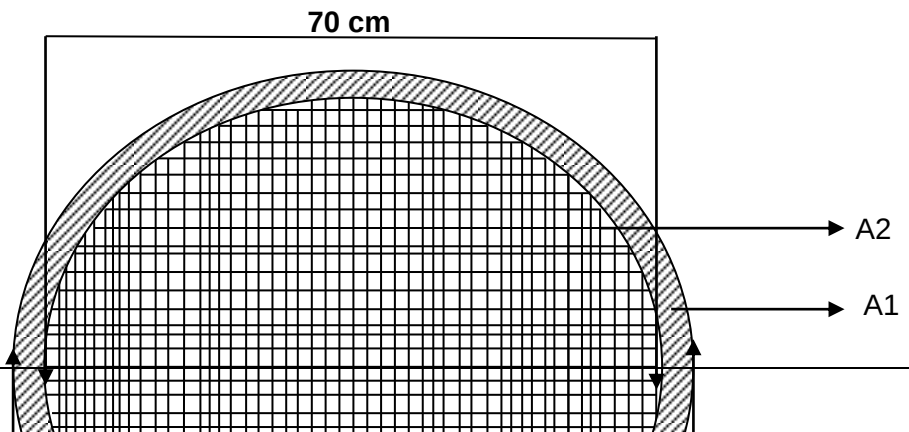
C1 = π x r x $(r^2+h^2)^{1/2}$
= 3.14 x 37.75 x $(37.75^2+10.5^2)^{1/2}$
= 4644.56

C2 = $\pi r^2$
= 3.14 x $6.6^2$
= 136.78

C3 = 2πrh
= 2 x 3.14 x 6.6 x 55
= 2279.64

C = C1 - C2 + C3
= 4644.56 - 136.78 + 2279.64
= 6787.42

Sieve (200 no):



**75 cm**

A = A1-A2

A1 = $\pi r^2$
= 3.14 x $37.5^2$
= 4415.63

A2 = $\pi r^2$
= 3.14 x $35^2$
= 3846.5

A = A1-A2
= 4415.63 - 3846.5
= 569.13

1 Linear inch (2.54 cm) contains 200 pores.

Each Pore size is 75µ (i.e, 0.0075 cm)

200 pores size = 200 x 0.0075
= 1.5 cm

Total surface area of sieve in inches = 3846.5/2.54
= 1514.37 cm

Each linear inch surface area contains 1.5 cm void space and 1.04 cm intact surface

Overall intact surface area of sieve apart from strip = 1514.37 x 1.04
= 1574.94 $cm^2$

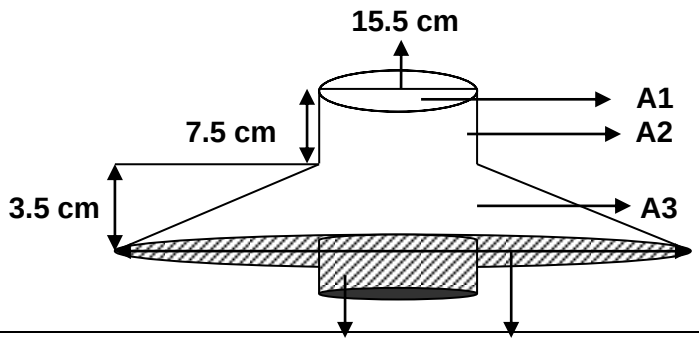
Total surface area of sieve along with strip = 1574.94 + 569.13
= 2144.1 $cm^2$

For both surfaces = 2144.1 x 2
= 4288.15 $cm^2$

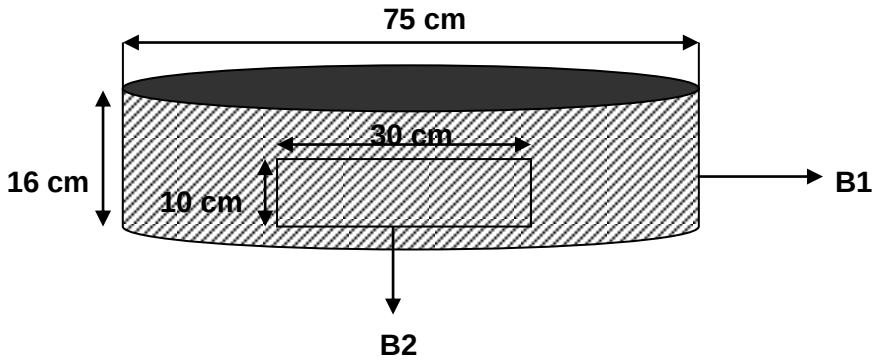
Vibro sifter = (A+B+C) + (A+B+C+D) + (A+B+C) + Sieve
= (108.53+438.82+3901.09) + (1099+569.13+2119.5+1628.46) + (1628.63 + 1066.82+ 6787.42) + 4288.15
= 23635.55$cm^2$

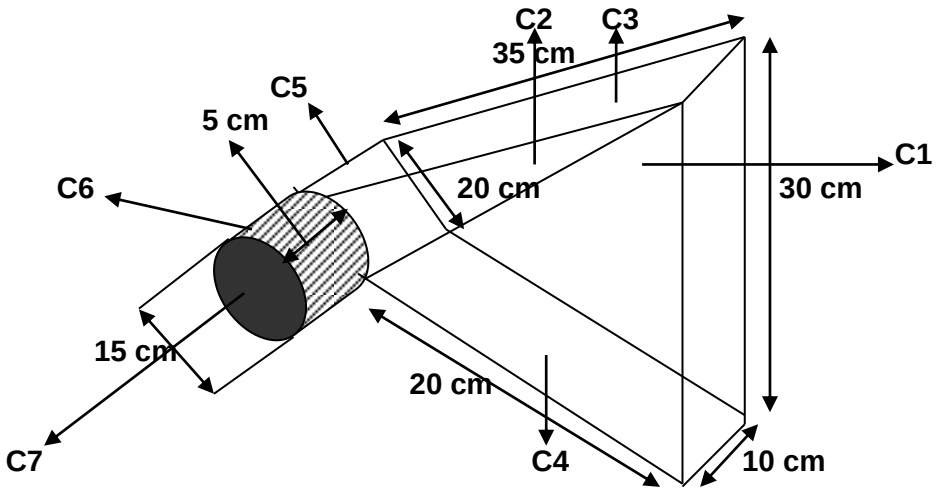
## VIBRO ENERGY SEPARATOR

Upper Hopper:



**A4** **75 cm**




A = A1 - A3 + A2 + A4

A1 = $\pi r^2$
= 3.14 x $7.75^2$
= 188.60

A2 = 2πrh
= 2 x 3.14 x 7.75 x 7.5
= 365.03

$A3 = \pi \times r \times (r^2+h^2)^{1/2}$
$= 3.14 \times 37.5 \times (37.5^2+3.5^2)^{1/2}$
$= 4434.82$

A4 = 2πrh (2 surfaces inner & outer)
= 2 x 3.14 x 7.75 x 7.5
= 365.03
= 365.03 x 2
= 730.06

A = A1 - A3 + A2 + A4
= 188.60 + 365.03 + 4434.82 + 730.06
= 5718.51

B = B1 - B2

B1 = 2πrh
= 2 x 3.14 x 37.5 x 16
= 3768

B2 = L x B
= 10 x 30
= 300

B = B1 - B2
= 3768 - 300
= 3668

C = C1 + C2 + C3 + C4 + C5 - C6

C1 = 1/2absin(c) (2 parallel inner surfaces)
= 0.5 x 30 x 20 x sin (30/20)
= 299.25
= 299.25 x 2
= 598.5

C2 = 1/2absin(c) (2 parallel inner surfaces)
= 0.5 x 35 x 20 x sin (35/20)
= 344.40

= 344.40 x 2
= 688.8

C3 = L x B
= 35 x 10
= 350

C4 = L x B
= 20 x 10
= 200

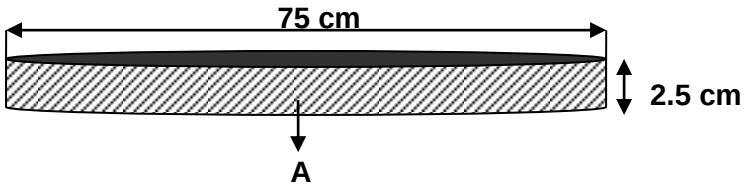
C5 = L x L
= 20 x 20
= 400

C6 = 2πrh
= 2 x 3.14 x 7.5 x 5
= 235.5

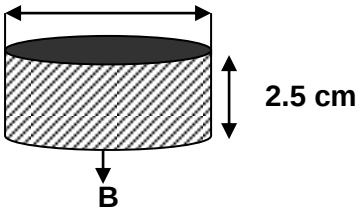
C7 = $\pi r^2$
= 3.14 x $7.5^2$
= 176.63

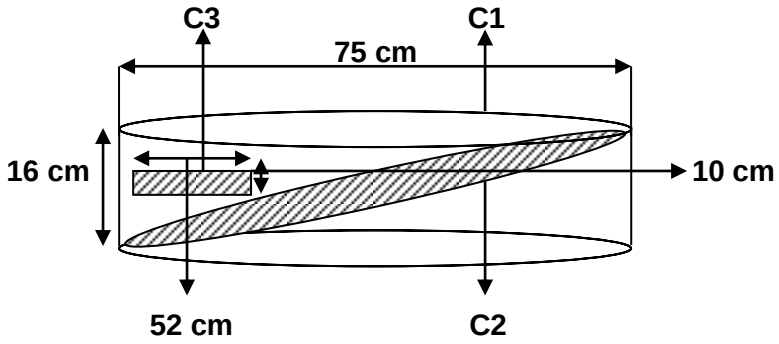
C = C1 + C2 + C3 + C4 + C5 + C6 - C7
= 598.5 + 688.8 + 350 + 200 + 400 + 235.5 - 176.63
= 2296.17

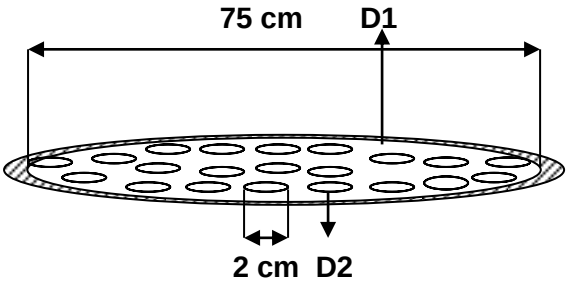
Lower Hopper:

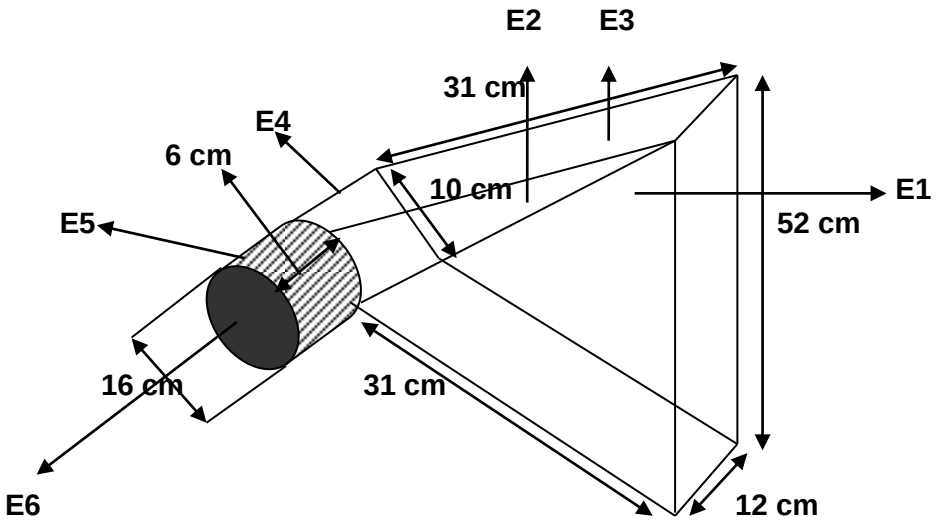



**6 cm**


2.5 cm
B


C3
C1
75 cm
16 cm
10 cm
52 cm
C2


75 cm
D1
2 cm
D2


E2
E3
31 cm
E4
6 cm
10 cm
E1
E5
52 cm
16 cm
31 cm
E6
12 cm

A = 2πrh
= 2 x 3.14 x 37.5 x 2.5
= 588.75

B = 2πrh (71 No's)
= 2 x 3.14 x 3 x 2.5
= 47.1
= 47.1 x 71
= 3344.1

C = C1+ C2 - C3

C1 = 2πrh (1/2 part of the whole)
= 2 x 3.14 x 37.5 x 16
= 3768
= 3768 x 0.5
= 1884

C2 = $\pi r^2$
= 3.14 x $37.5^2$
= 4415.63

C3 = L x B
= 52 x 10
= 520

C = C1 + C2 - C3
= 1884 + 4415.63 - 520
= 5779.63
D = D1 - D2

D1 = $\pi r^2$
= 3.14 x $37.5^2$
= 4415.63

D2 = $\pi r^2$ (750 No's)
= 3.14 x 1
= 3.14
= 3.14 x 750
= 2355

D = D1 - D2

= 4415.63 - 2355
= 2060.63

E = E1 + E2 + E3 + E4 + E5 - E6

E1 = 1/2absin(c) (2 parallel inner surfaces)
= 0.5 x 52 x 31 x sin (52/31)
= 801.42
= 801.42 x 2
= 1602.84

E2 = 1/2absin(c) (2 parallel inner surfaces)
= 0.5 x 31 x 10 x sin (31/10)
= 6.45
= 6.45 x 2
= 12.9

E3 = L x B (2 parallel inner surfaces)
= 31 x 12
= 372
= 372 x 2
= 744

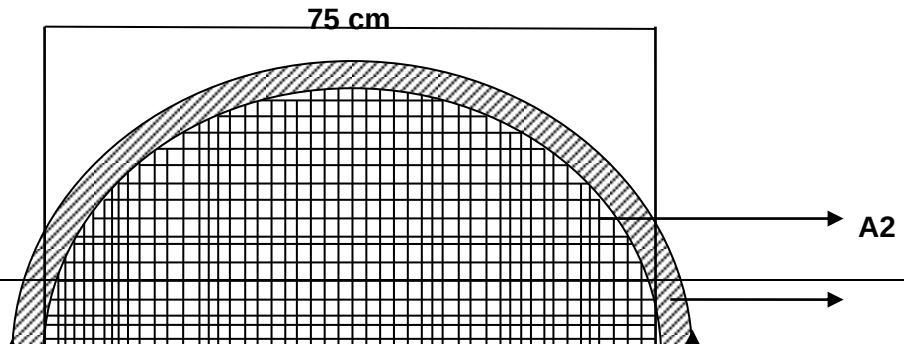
E4 = L x L
= 10 x 10
= 100

E5 = 2πrh
= 2 x 3.14 x 8 x 6
= 301.44

E6 = $\pi r^2$
= 3.14 x $8^2$
= 200.96

E = E1 + E2 + E3 + E4 + E5 - E6
= 1602.84 + 12.9 + 744 + 100 + 301.44 + 200.96
= 2962.14

Sieve:



**A1**

**80 cm**

A = A1-A2

A1 = $\pi r^2$
= 3.14 x $40^2$
= 5024

A2 = $\pi r^2$
= 3.14 x $37.5^2$
= 4415.63

A = A1-A2
= 5024 - 4415.63
= 608.37

1 Linear inch (2.54 cm) contains 100 pores.
Each Pore size is 75µ (i.e., 0.0075 cm)

100 pores size = 100 x 0.0075
= 0.75 cm

Total surface area of sieve in inches = 4415.63/2.54
= 1738.44 cm

Each linear inch surface area contains 1.5 cm void space and 1.04 cm intact surface.

Overall intact surface area of sieve apart from strip = 1738.44 x 1.04
= 1807.98 $cm^2$

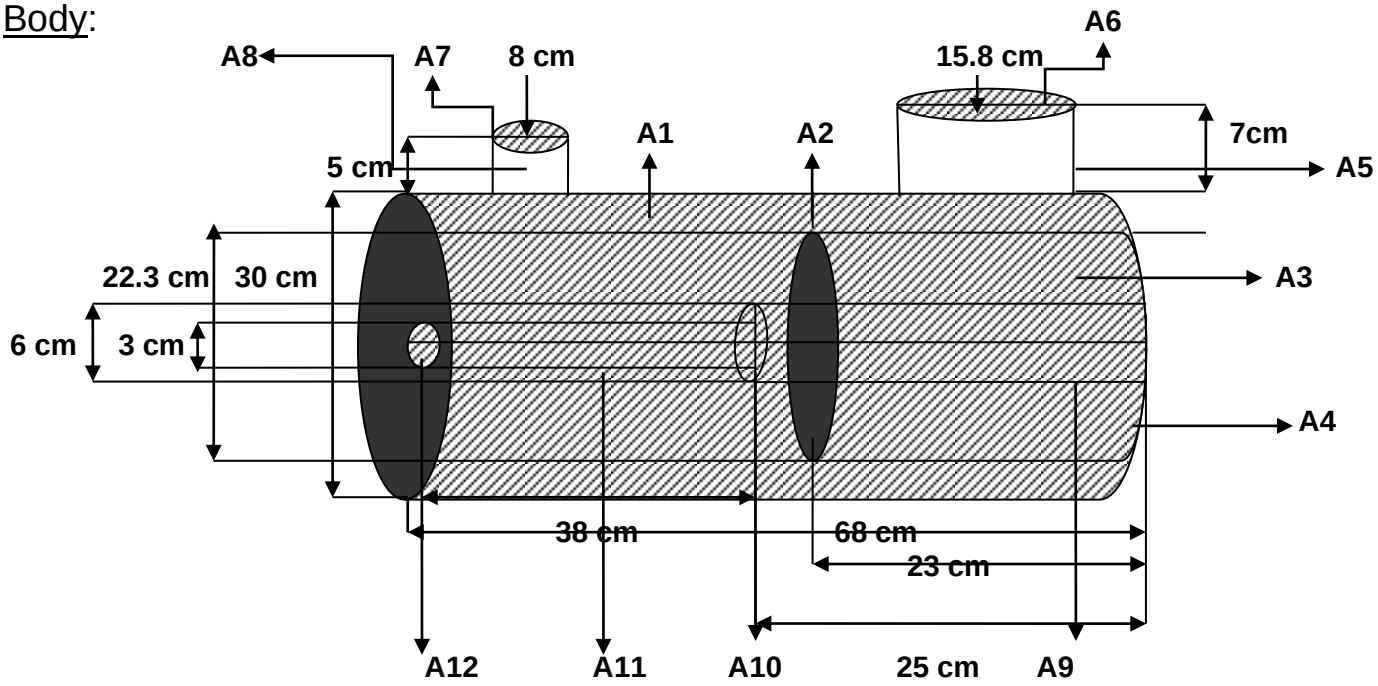
Total surface area of sieve along with strip = 1807.98 + 608.37
= 2416.35 $cm^2$

For both surfaces = 2416.35 x 2
= 4832.7 $cm^2$

Vibro energy separator = (A+B+C) + (A+B+C+D+E) + Sieve
= (5718.51+3668+2296.17) + (588.75+3344.1+5779.63+2060.63+2962.14) + 4832.7
= 31250.63 $cm^2$

## TURBO SIFTER

Body:




A = (A1-A7) + (A2-A4) + (A3-A6) + (A4-A10) + A5 + A8 + A9 + (A10-A12) + A11+ A12

A1 = 2πrh
= 2 x 3.14 x 15 x 45
= 4239

A2 = $\pi r^2$
= 3.14 x $15^2$
= 706.5

A3 = 2πrh
= 2 x 3.14 x 11.5 x 23
= 1161.06

A4 = $\pi r^2$
= 3.14 x $11.5^2$

= 415.27

A5 = 2πrh
= 2 x 3.14 x 7.9 x 7
= 347.28

A6 = $\pi r^2$
= 3.14 x $7.9^2$
= 195.97

A7 = $\pi r^2$
= 3.14 x $4^2$
= 50.24

A8 = 2πrh
= 2 x 3.14 x 4 x 5
= 125.6

A9 = 2πrh
= 2 x 3.14 x 3 x 25
= 471

A10 = $\pi r^2$
= 3.14 x $3^2$

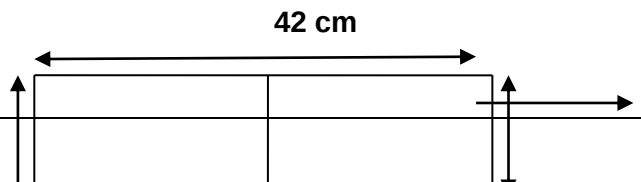
= 28.26

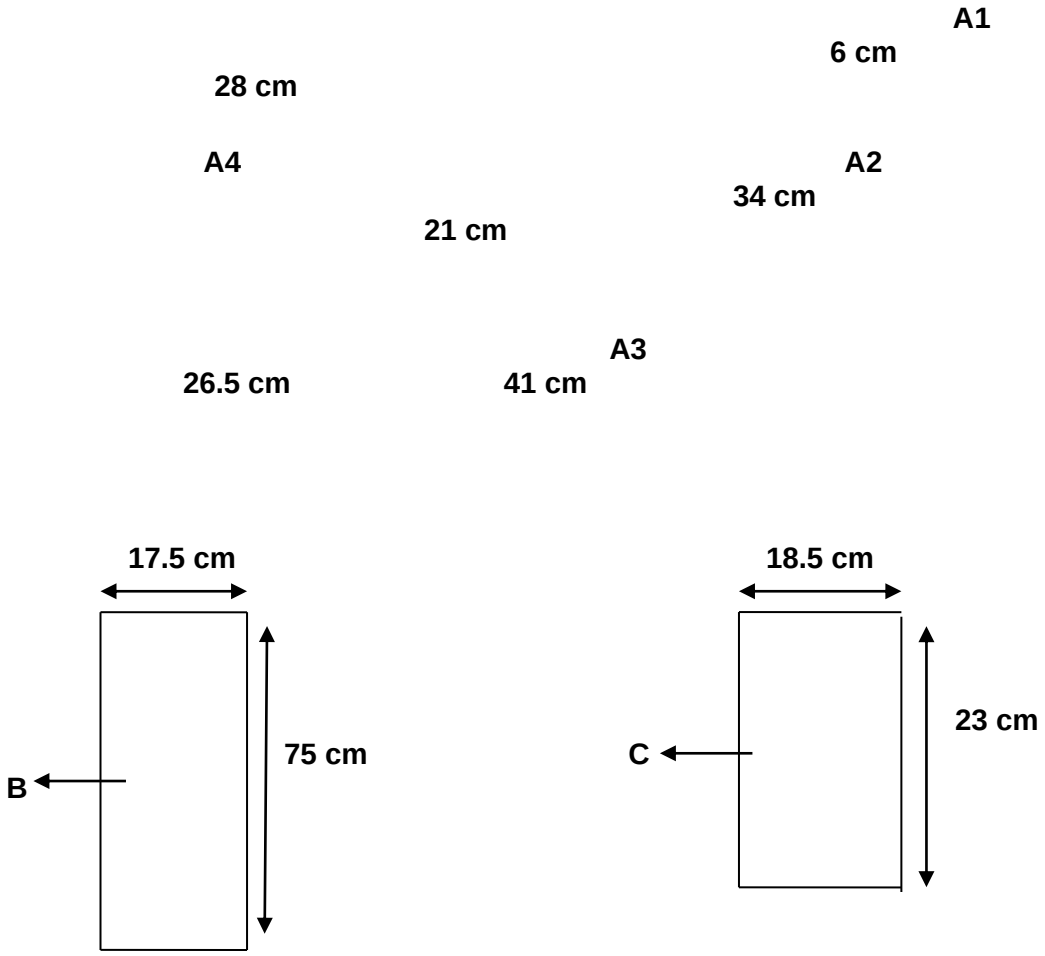
A11 = 2πrh
= 2 x 3.14 x 1.5 x 38
= 357.96

A12 = $\pi r^2$
= 3.14 x $1.5^2$
= 7.07

A = (A1-A7) + (A2-A4) + (A3-A6) + (A4-A10) + A5 + A8 + A9 + (A10-A12) + A11+ A12
= (4239-50.24) + (706.5-415.27) + (1161.06-195.97) + (415.27-28.26) + 347.28 + 125.6 + 471 + (28.26-7.07) + 357.96 + 7.07
= 7162.19

Discharge chute:






A = A1 + A2 + A3 + A4

A1 = l x b
= 21 x 6
= 126

A2 = sqrt(s(s-a) (s-b) (s-c))
= sqrt (38.5(38.5-34) (38.5-21) (38.5-22))
= 223.66

A3 = sqrt(s(s-a) (s-b) (s-c))
= sqrt (44.25(44.25-41) (44.25-21) (44.25-26.5))
= 243.6178

A4 = l x b
= 28 x 21
= 588

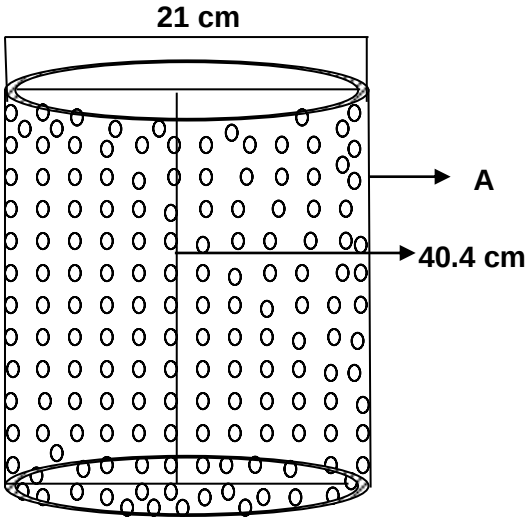
A = A1 + A2 + A3 + A4 (2 opposite surfaces)
= 126 + 223.66 + 243.62 + 588
= 1181.28
= 2362.56

B = l x b
= 75 x 17.5
= 1312.5

C = l x b
= 23 x 18.5
= 425.5

A + B + C = 2362.56 + 1312.5 + 425.5
= 4100.56

Screen (0.5 mm):




A = 2πrh
= 2 x 3.14 x 10.5 x 40.4
= 2663.98

1linear inch perpendicular to the screen surface placed on plain surface with a pose of cylindrical contains 11 pores.

Each pore size = 0.5 mm
For 11 pores = 11 x 0.5
= 5.5 mm (0.55 cm)
2663.98 $cm^2$ surface area in inches = 2663.98/2.54
= 1048.81
2663.98 $cm^2$ surface area contains void space of = 1048.81 x 0.55
= 576.85
= 576.85 x 2.54
= 1465.2 $cm^2$
Total intact surface of the screen = 2663.98 - 1465.2

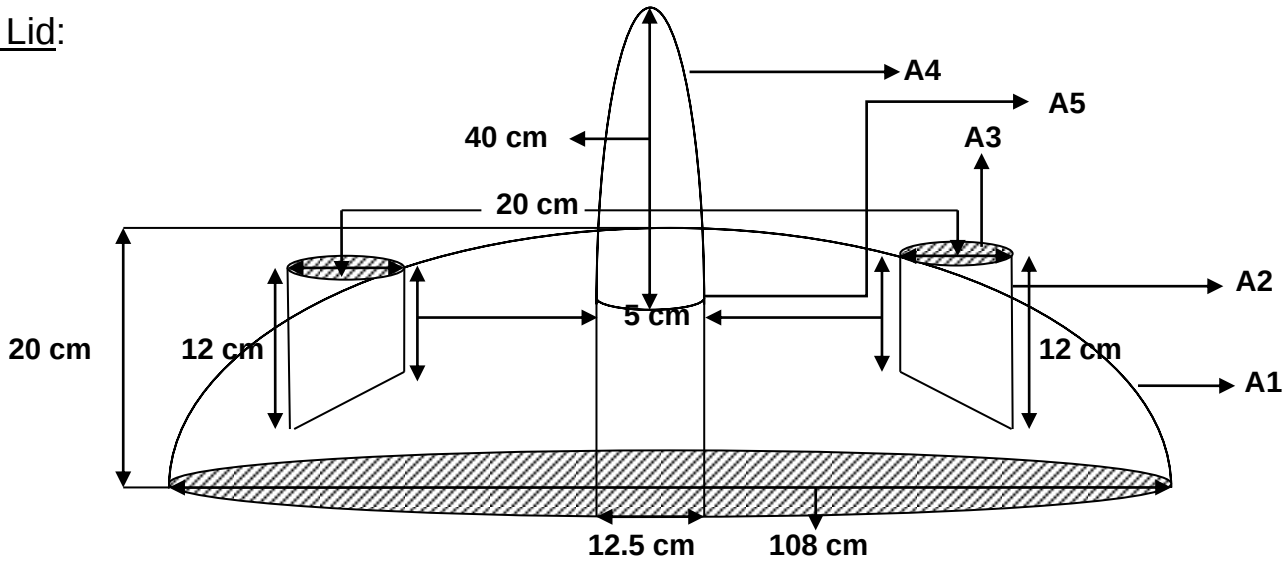
= 1198.78 $cm^2$

2 surfaces (interior and exterior) = 1198.78 x 2
= 2397.56 $cm^2$

Turbo sifter = A + (A+B+C) + Screen
= 7162.19 + 4741 + 2397.56
= 14300.75 $cm^2$

## RAPID MIXTURE GRANULATOR (700 L)

Upper Lid:




A = A1 + A2 - A3 + A4 - A5

A1 = (π x $D^2$)/2

$= (3.14 \times 54^2)/2$
$= 4578.12$

$A2 = 2\pi r1/2(h1+h2)$
$= 2 \times 3.14 \times 10 \times 0.5(5+12)$
$= 533.8$

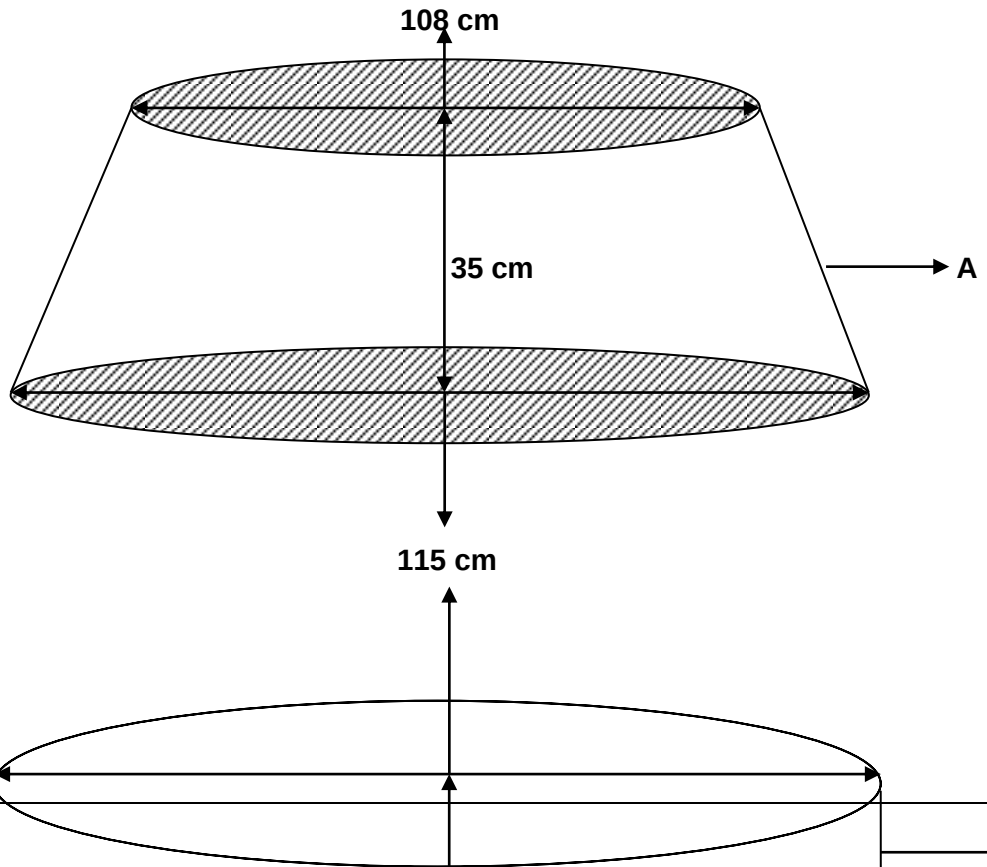
$A3 = \pi r^2$
$= 3.14 \times 10 \times 10$
$= 314$

$A4 = \pi \times r \times (r^2+h^2)^{1/2}$
$= 3.14 \times 6.25 \times (6.25^2+40^2)^{1/2}$
$= 794.52$

$A5 = \pi r^2$
$= 3.14 \times 6.25^2$
$= 122.66$

$A = A1 + A2 - A3 + A4 - A5$
$= 4578.12 + 533.8 - 314 + 794.52 - 122.66$
$= 5469.78$

Bowl:



**B1**

**27 cm** **B3**

**B2** **27 cm** **20 cm**

$A = \pi \times (r1+r2) \times (h^2 + (r1-r2)^2)^{1/2}$
$= 3.14 \times (57.5+54) \times (35^2 + (57.5-54)^2)^{1/2}$
$= 12314.97$

$B = B1 - B2 - B3$

$B1 = 2\pi r(r+h)$
$= 2 \times 3.14 \times 57.5 \times (57.5+27)$
$= 30512.95$

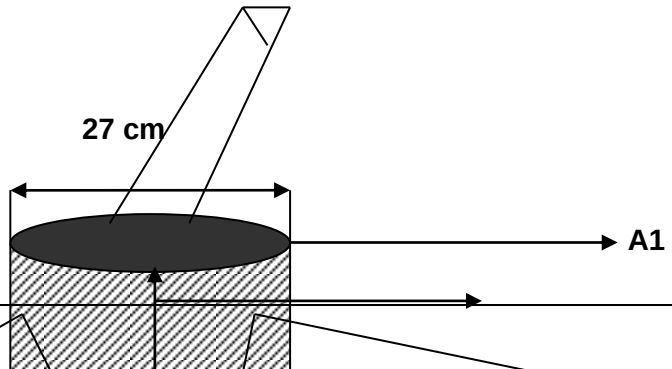
$B2 = \pi r^2$
$= 3.14 \times 13.5^2$
$= 572.27$

$B3 = \pi r^2$
$= 3.14 \times 10^2$
$= 314$

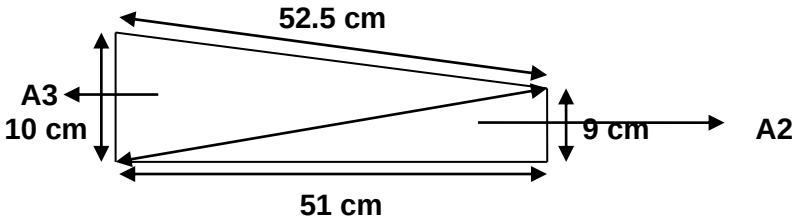
$B = B1 - B2 - B3$
$= 30512.95 - 572.27 - 314$
$= 29626.68$

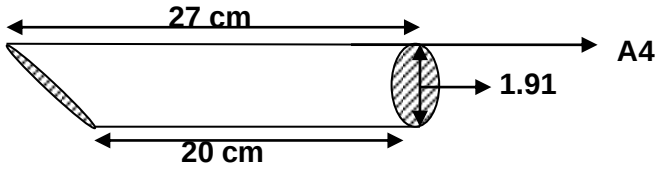
$A + B = 11983.99 + 29626.68 = 41610.67$

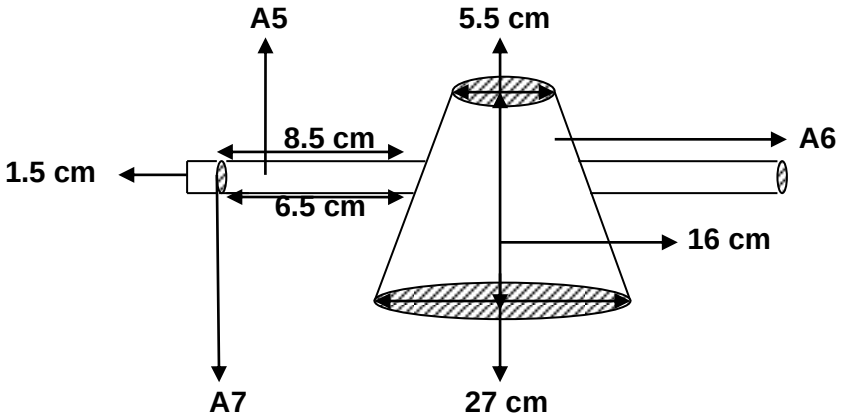
Impeller:



16.5 cm




A = A1 + A2 + A3 + A4 + A5 + A6 + A7

A1 = 2πrh
= 2 x 3.14 x 13.5 x 16.5
= 1398.87

A2 = 1/2absin(c) (3 no's + 3 surfaces)
= 0.5 x 51 x 9 x sin (9/51)
= 40.29
= 40.29 x 6

= 241.74

A3 = 1/2absin(c) (3 no's + 3 surfaces)
= 0.5 x 52.5 x 10 x sin (10/52.5)
= 49.70
= 49.70 x 6
= 298.2

A4 = 2πr1/2(h1+h2) (3 no's)
= 2 x 3.14 x 0.95 x 0.5(27+20)
= 140.2
= 140.2 x 3
= 420.6

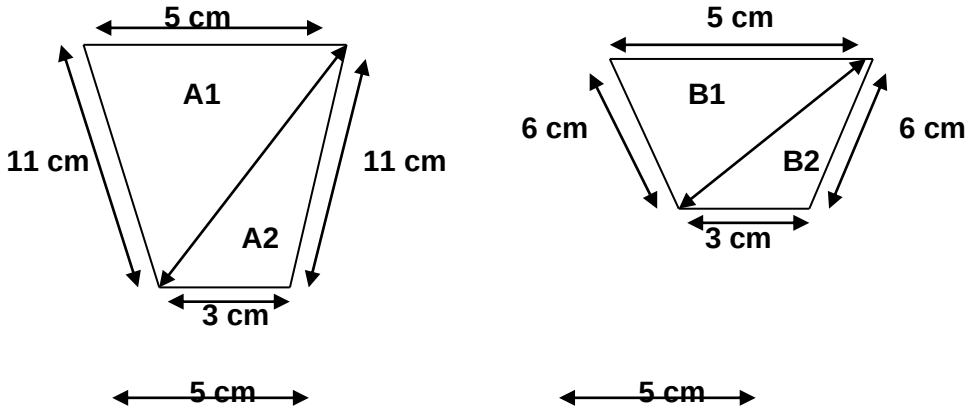
A5 = 2πr1/2(h1+h2) (2 no's)
= 2 x 3.14 x 0.75(8.5+6.5)
= 70.65
= 70.65 x 2
= 141.3

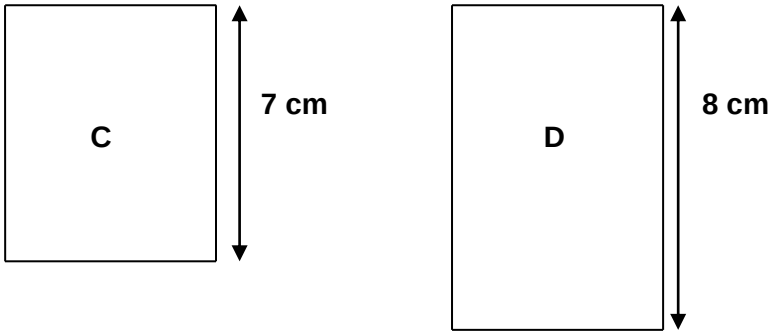
A6 = π x (r1+r2) x $(h^2+ (r1-r2)^2)^{1/2}$
= 3.14 x (13.5+2.75) x $(16^2 + (13.5-2.75)^2)^{1/2}$
= 939.70

A7 = $\pi r^2$
= 3.14 x $0.75^2$
= 1.77

A = A1 + A2 + A3 + A4 + A5 + A6 + A7
= 1398.87 + 241.74 + 298.2 + 420.6 + 141.3 + 939.70 + 1.77
= 3442.18

Chopper Blade:






A = A1 + A2

A1 = 1/2absin(c) (2 surfaces + 2 no's)
= 0.5 x 5 x 11 x sin (5/11)
= 12.1
= 12.1 x 4 = 48.4
A2 = 1/2absin(c) (2 surfaces + 2 no's)
= 0.5 x 3 x 11 x sin (3/11)
= 4.46
= 4.46 x 4
= 17.82

A = A1 + A2
= 48.4+17.82
= 66.22

B = B1 + B2

B1 = 1/2absin(c) (2 surfaces + 2 no's)
= 0.5 x 5 x 6 x sin (5/6)
= 11.1
= 11.1 x 4
= 44.4

B2 = 1/2absin(c) (2 surfaces + 2 no's)
= 0.5 x 3 x 6 x sin (3/6)
= 4.32
= 4.32 x 4
= 17.28

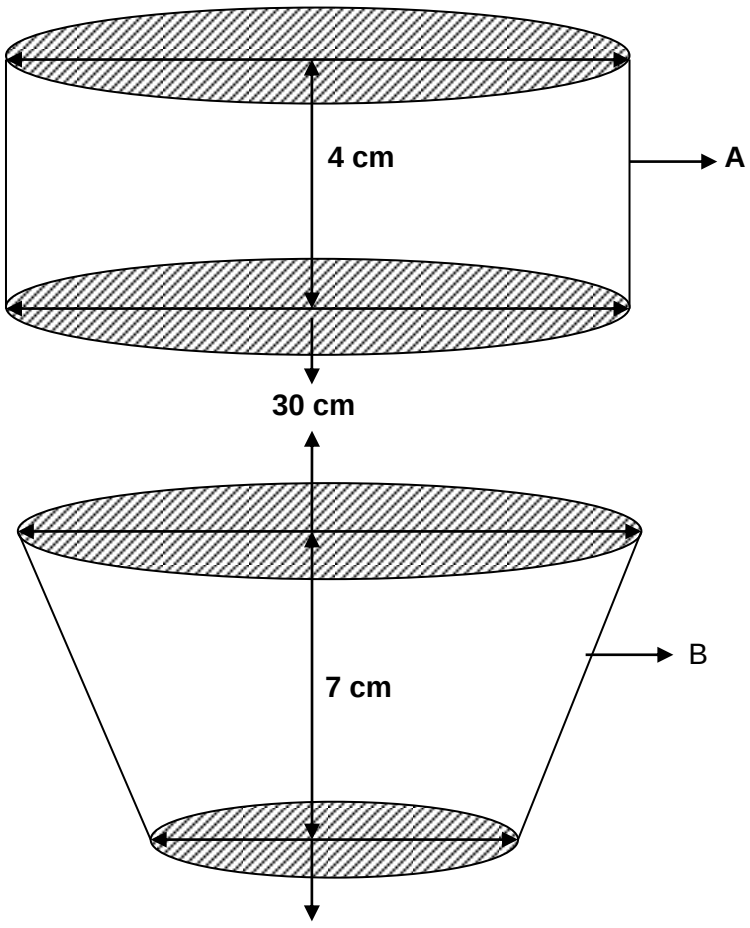
B = B1 + B2
= 44.4 + 17.28
= 61.68

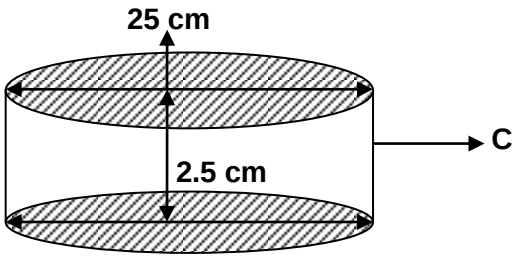
C = l x b (2 surfaces)
= 5 x 7
= 35
= 35 x 2
= 70

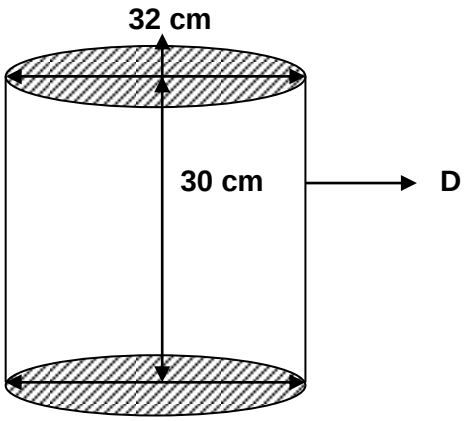
D = l x b (2 surfaces)
= 5 x 8
= 40
= 40 x 2
= 80

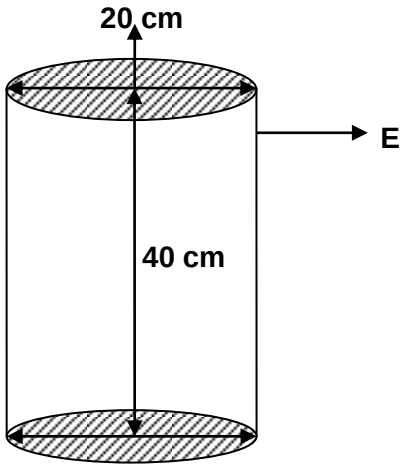
A + B + C + D
= 66.22 + 61.68 + 70 + 80
= 277.9

Co-mill:






A = 2πrh
= 2 x 3.14 x 15 x 4
= 376.8

B = π x (r1+r2) x $(h^2+ (r1-r2)^2)^{1/2}$
= 3.14 x (15+12.5) x $(7^2 + (15-12.5)^2)^{1/2}$
= 4770.84

C = 2πrh

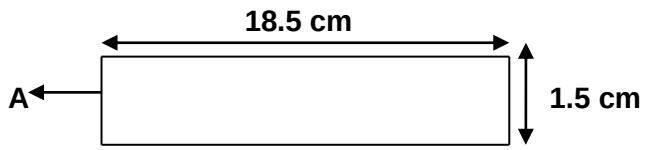
= 2 x 3.14 x 12.5 x 2.5
= 196.25

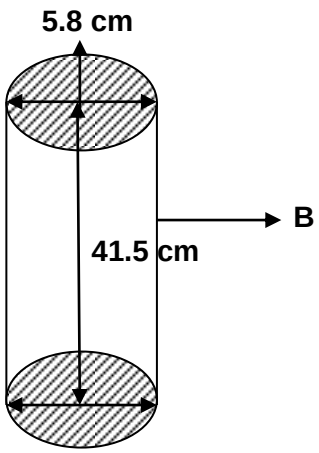
D = 2πrh
= 2 x 3.14 x 15.93 x 30
= 3002.21

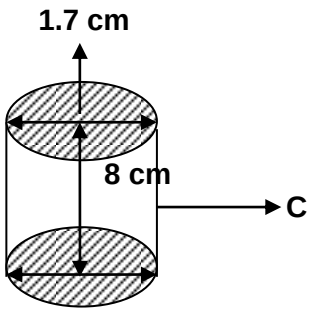
E = 2πrh
= 2 x 3.14 x 10 x 40
= 2512

A + B + C + D + E
= 376.8 + 4770.84 + 196.25 + 3002.21 + 2512
= 10857.1

Blade:




A = l x b (4 surfaces + 2 no's)
= 18.5 x 1.5
= 27.75
= 27.75 x 6
= 166.5

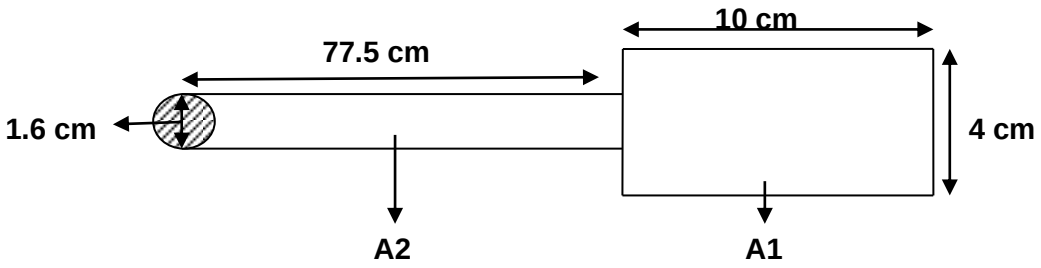
B = 2πrh
= 2 x 3.14 x 2.59 x 41.5
= 675.01

C = 2πrh (2 no's)
= 2 x 3.14 x 0.85 x 8
= 42.7

= 42.7 x 2
= 85.4

A + B+ C
= 166.5 + 675.01 + 85.4
= 926.91

Raker:




A = A1 + A2

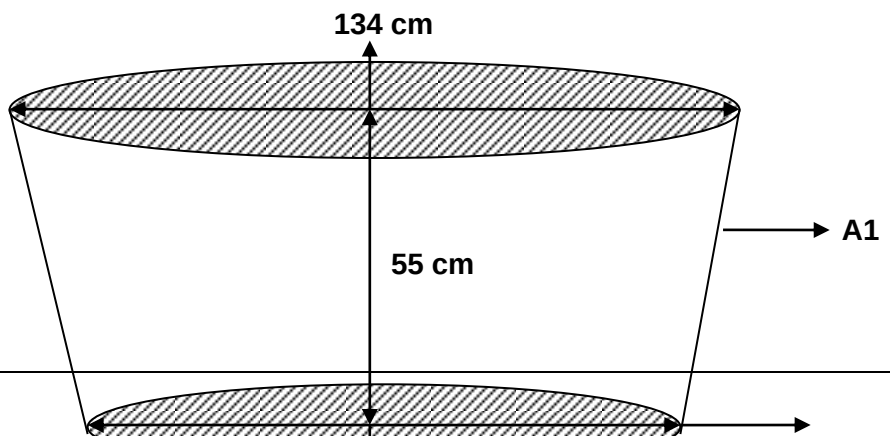
A1 = l x b (2 surfaces)
= 10 x 4
= 40
= 40 x 2
= 80
A2 = 2πrh
= 2 x 3.14 x 0.8 x 77.5
= 389.36

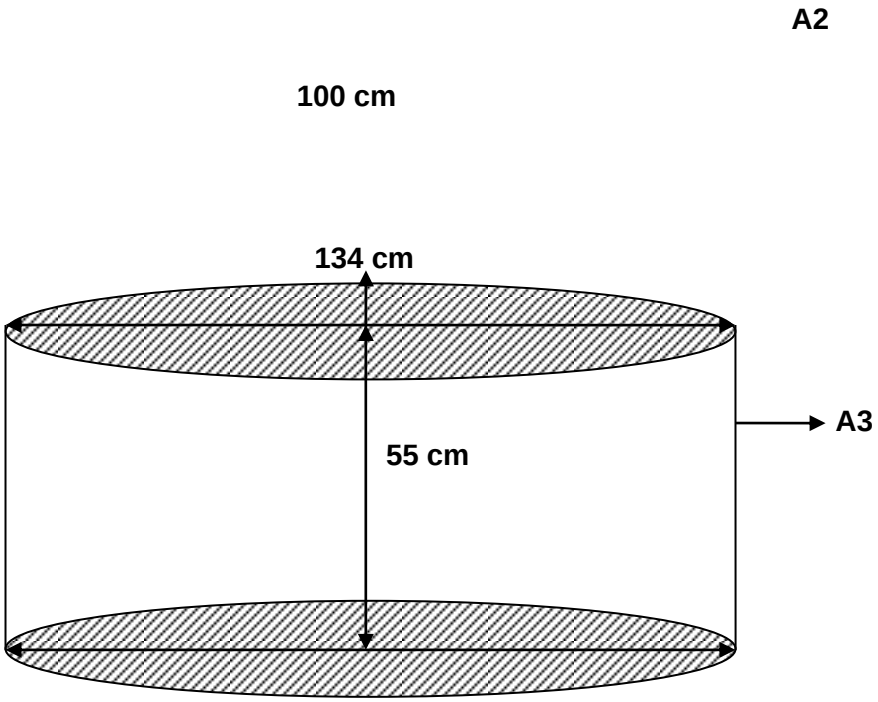
A = A1 + A2
= 80 + 389.36
= 469.36

RMG = A + (A+B) + A + (A+B+C+D) + (A+B+C+D+E) + (A+B+C) + A
= 5469.78 + 41610.67 + 3442.18 + 277.9 + 10857.1 + 926.91 + 469.36
= 63053.9 $cm^2$

## FLUID BED DRYER

Bowl:






A = A1 + A2 + A3

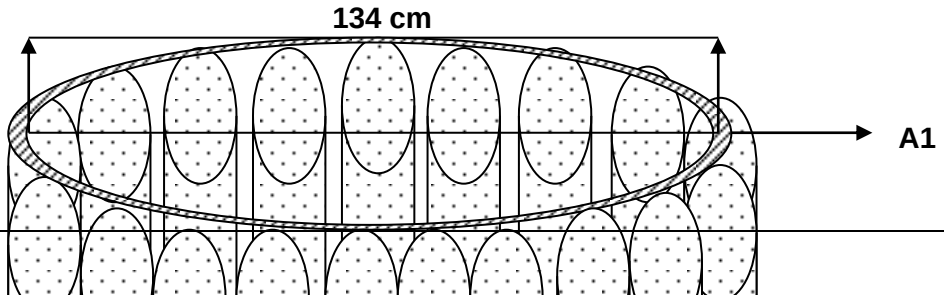
A1 = π x (r1+r2) x $(h^2 + (r1-r2)^2)^{1/2}$
= 3.14 x (67+50) x $(55^2 + (67-50)^2)^{1/2}$
= 20206.14

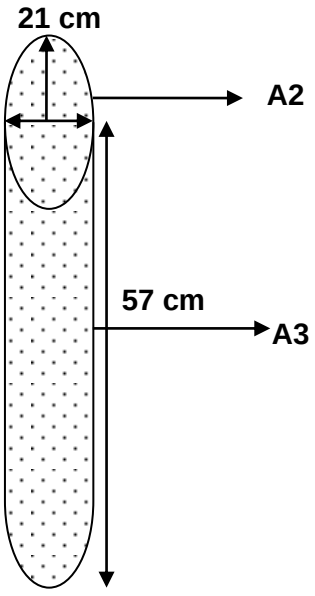
A2 = $\pi r^2$
= 3.14 x $50^2$
= 7850

A3 = 2πrh
= 2 x 3.14 x 67 x 55
= 23141.8

A = A1 + A2 + A3
= 20206.14 + 7850 + 23141.8
= 51197.94

Finger Bag:






A = A1 - A2 + A3

A1 = $\pi r^2$
= 3.14 x $67^2$
= 14095.46

A2 = $\pi r^2$ (19 no's)
= 3.14 x $10.5^2$
= 346.19
= 346 x 19

= 6574

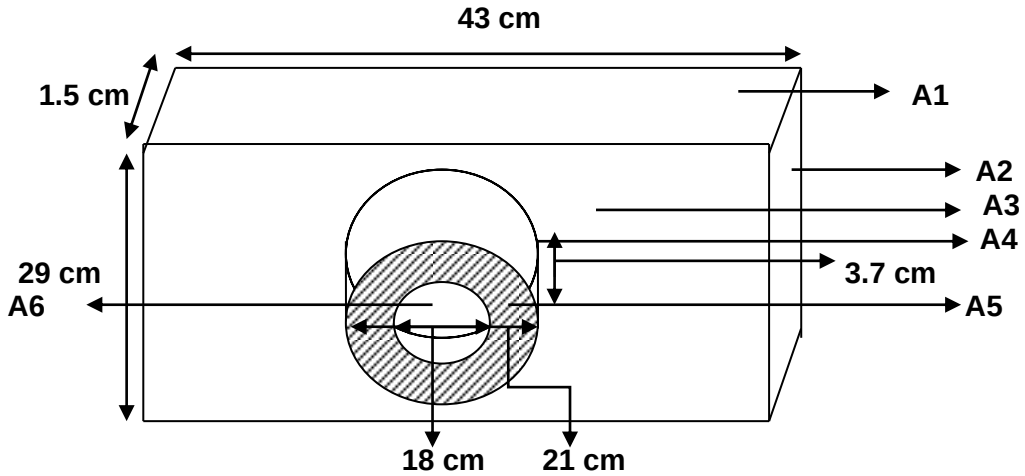
A3 = 2πrh (19 no's)
= 2 x 3.14 x 10.5 x 57
= 3758.58
= 3758.58 x 19
= 71413.02

A = A1 - A2 + A3
= 14095.46 - 6574 + 71413.02
= 78934.48

FBD = A + A
= 51197.94 + 78934.48
= 130132.4 $cm^2$

## MULTIMILL

Feeder Cover:




A = A1+ A2 + (A3-A5) + A4 + (A5-A6)

A1 = l x b
= 43 x 1.5
= 64.5

A2 = l x b (2 no's)
= 29 x 1.5
= 43.5
= 43.5 x 2
= 87

A3 = l x b
= 29 x 43
= 1247

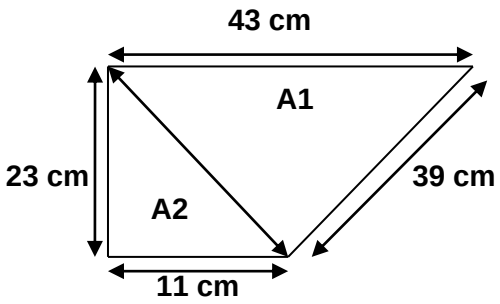
A4 = 2πrh
= 2 x 3.14 x 10.5 x 3.5
= 230.79

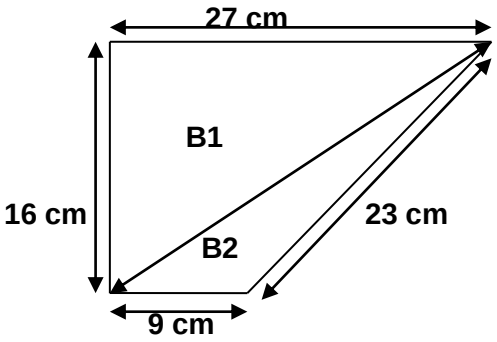
A5 = $\pi r^2$
= 3.14 x $10.5^2$
= 346.185

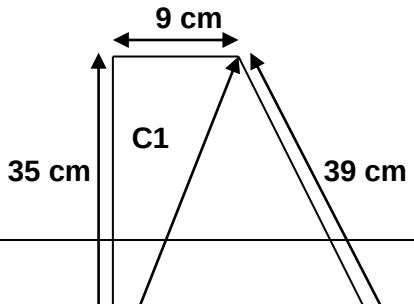
A6 = $\pi r^2$
= 3.14 x $9^2$
= 254.34

A = A1+ A2 + (A3-A5) + A4 + (A5-A6)
= 64.5 + 87 + (1247-346.185) + 230.79 + (346.185-254.34)
= 1374.95

Feeder:

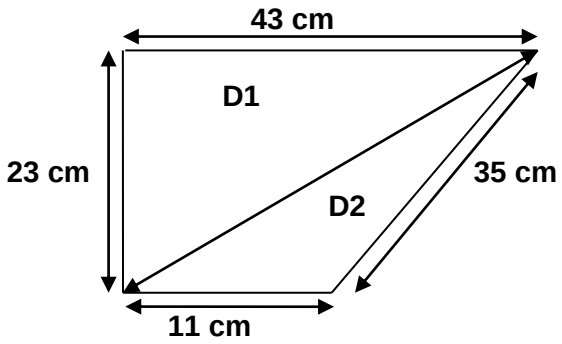


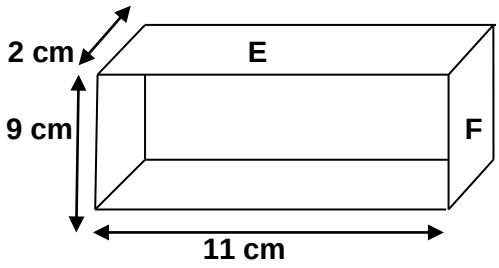



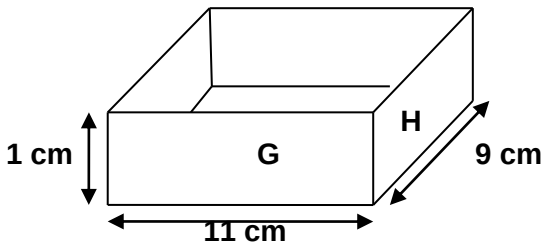



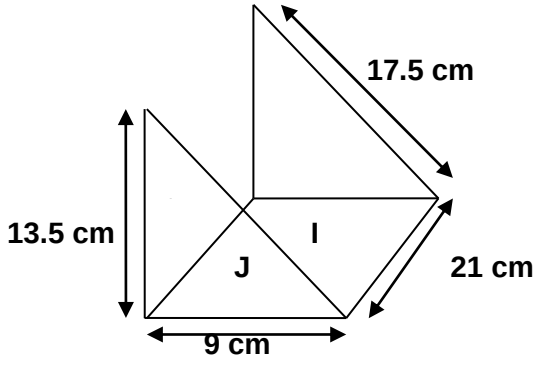
**C2**

**27 cm**


43 cm
D1
23 cm
35 cm
D2
11 cm


2 cm
E
9 cm
F
11 cm


H
1 cm
G
9 cm
11 cm


17.5 cm
13.5 cm
I
J
21 cm
9 cm

A = A1 + A2

A1 = 1/2absin(c)
= 0.5 x 43 x 39 x sin (39/43)
= 662.42

A2 = 1/2absin(c)
= 0.5 x 23 x 11 x sin (11/23)
= 58.19

A = A1 + A2
= 662.42 + 58.19
= 720.61

B = B1 + B2

B1 = 1/2absin(c)
= 0.5 x 28 x 16 x sin (16/28)
= 120.96

B2 = 1/2absin(c)
= 0.5 x 9 x 23 x sin (9/23)
= 39.33

B = B1 + B2
= 120.96 + 39.33
= 160.29

C = C1 + C2

C1 = 1/2absin(c)
= 0.5 x 9 x 36 x sin (9/36)
= 40.5

C2 = 1/2absin(c)
= 0.5 X 27 x 39 x sin (27/39)
= 326.43

C = C1 + C2
= 40.5 + 326.43
= 366.93

D = D1 +D2

D1 = 1/2absin(c)
= 0.5 x 43 x 23 x sin (23/43)
= 252.20

D2 = 1/2absin(c)
= 0.5 x 11 x 35 x sin (11/35)
= 59.68

D = D1 +D2
= 252.20 + 59.68
= 311.88

E = l x b (2 no's)
= 2 x 9
= 18
= 18 x 2
= 36

F = l x b (2 no's)
= 2 x 9
= 18
= 18 x 2
= 36.

G = l x b (2 no's)
= 11 x 1
= 11
= 11 x 2
= 22

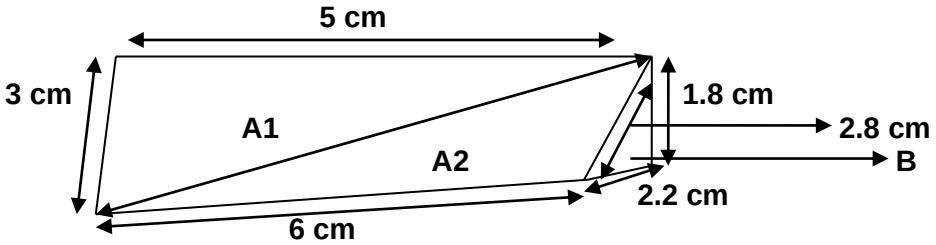
H = l x b (2 no's)
= 9 x 1
= 9
= 9 x 2
= 18

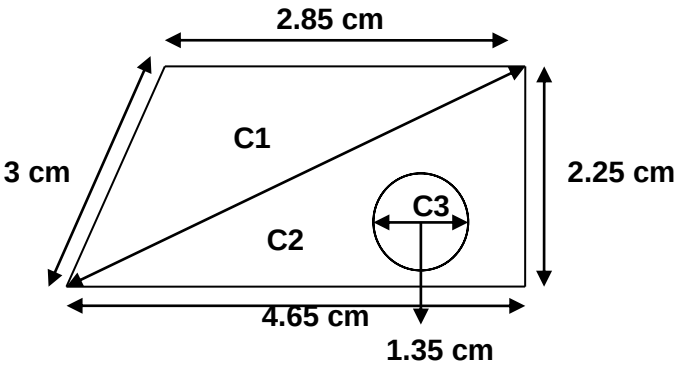
I = l x b
= 21 x 9
= 189

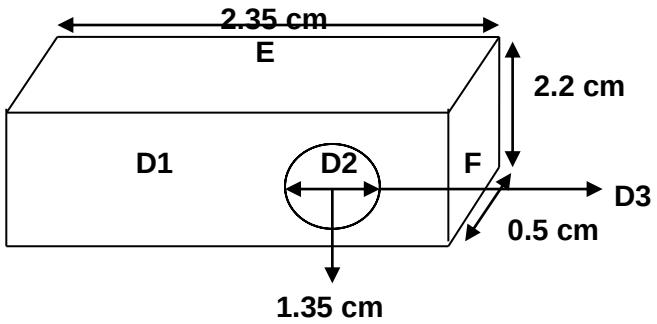
J = 1/2absin(c) (2 no's)
= 0.5 x 9 x 14.4 x sin (9/14.4)
= 38.23
= 38.23 x 2
= 76.46

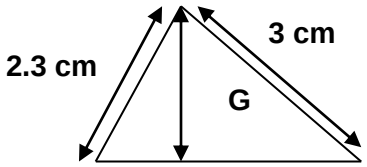
A + B + C + D + E + F + G + H + I + J
= 720.61 + 160.29 + 366.93 + 311.88 + 36 + 36 + 22 + 18 + 189 + 76.46
= 1937.17

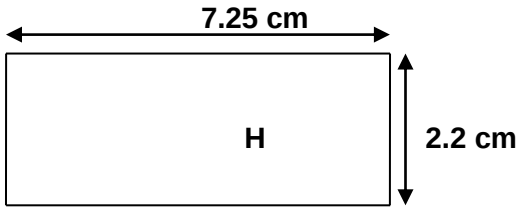
Blade:(Long)






A = A1 + A2

A1 = 1/2absin(c)
= 0.5 x 5 x 3 x sin (3/5)
= 4.13

A2 = 1/2absin(c)
= 0.5 x 6 x 2.8 x sin (2.8/6)
= 3.78

A = A1 + A2
= 4.13 + 3.78
= 7.91

B = sqrt (s(s-a) (s-b) (s-c))
= sqrt (5.7(5.7-2.8) (5.7-1.8) (5.7-2.2))
= 15.02

C = C1 + C2 - C3

C1 = 1/2absin(c)
= 0.5 x 3 x 2.85 x sin (2.85/3)
= 3.46

C2 = 1/2absin(c)
= 0.5 x 2.25 x 4.65 x sin (2.25/4.65)
= 2.46

C3 = $\pi r^2$
= 3.14 x $0.675^2$

= 1.43

C = C1 + C2 - C3
= 3.46 + 2.46 + 1.43
= 7.35

D = D1-D2+D3

D1 = l x b
= 2.35 x 2.2
= 5.17

D2 = $\pi r^2$
= 3.14 x $0.675^2$
= 1.43

D3 = 2πrh
= 2 x 3.14 x 0.675 x 0.5
= 2.12

D = D1-D2+D3
= 5.17-1.43+2.12
= 5.86

E = l x b
= 2.35 x 0.5
= 1.18

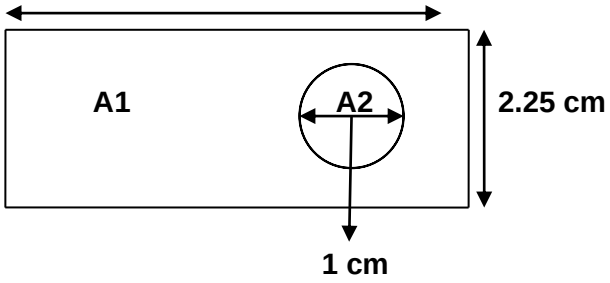
F = l x b
= 2.2 x 0.5
= 1.1

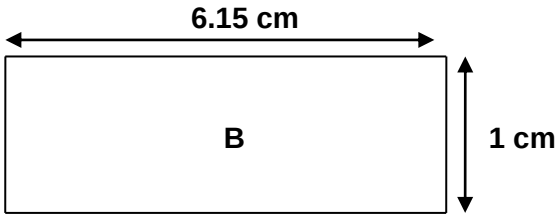
G = 1/2absin(c)
= 0.5 x 2.3 x 3 x sin (2.3/3)
= 2.38

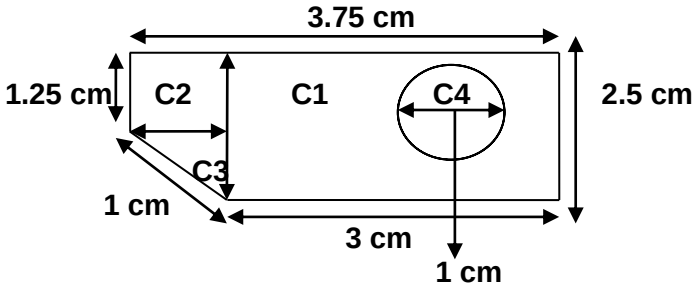
H = l x b
= 7.25 x 2.2
= 15.95

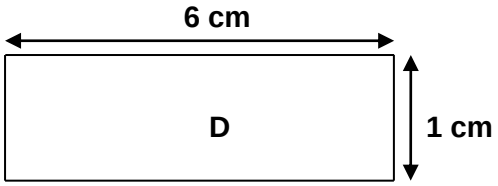
A + B + C + D + E + F + G + H (2 no's)
= (7.19 + 15.02 + 7.35 + 5.86 + 1.18 + 1.1 + 2.38 + 15.95) x 2
= 112.06

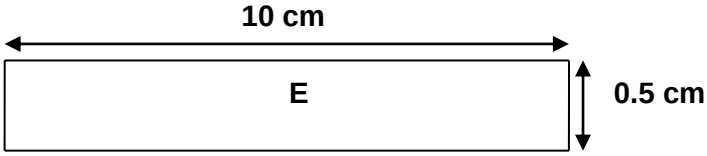
Short: **10 cm**

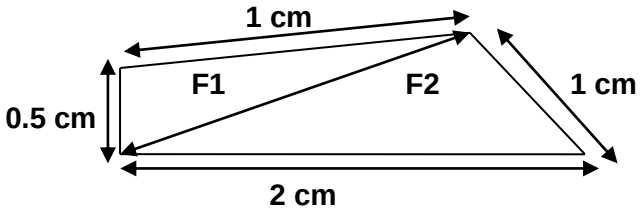

A1
A2
2.25 cm
1 cm

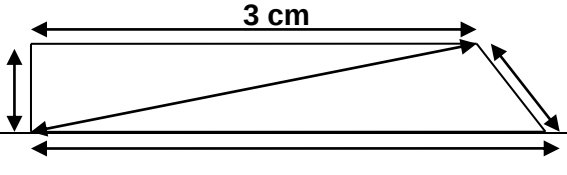

6.15 cm
B
1 cm


3.75 cm
1.25 cm
C2
C1
C4
2.5 cm
C3
1 cm
3 cm
1 cm


6 cm
D
1 cm

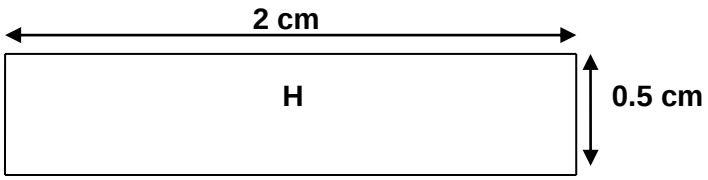

10 cm
E
0.5 cm


1 cm
F1
F2
1 cm
0.5 cm
2 cm


3 cm

**0.5 cm** **G1** **G2** **0.5 cm**

**3.5 cm**




A = A1- A2

A1 = l x b
= 10 x 2.25
= 22.5

A2 = $\pi r^2$
= 3.14 x $0.5^2$
= 0.79

A = A1- A2
= 22.5 - 0.785
= 21.72

B = l x b
= 6.15 x 1
= 6.15

C = C1 - C4 + C2 + C3

C1 = l x b
= 3 x 2.5
= 7.5

C2 = l x b
= 1.25 x 0.75
= 0.94

C3 = sqrt (s(s-a) (s-b) (s-c))
= sqrt (1.5(1.5-1) (1.5-0.75) (1.5-1.25)
= 0.38

$C4 = \pi r^2$
$= 3.14 \times 0.5^2$
$= 0.79$

C = C1 - C4 + C2 + C3
= 7.5 - 0.79 + 0.94 + 0.38
= 8.03

D = l x b
= 6 x 1
= 6

E = l x b
= 10 x 0.5
= 5

F = F1 + F2

F1 = 1/2absin(c)
= 0.5 x 1 x 0.5 x sin (0.5/1)
= 0.12

F2 = 1/2absin(c)
= 0.5 x 1 x 2 x sin (1/2)
= 0.48

F = F1 + F2
= 0.12 + 0.48
= 0.6

G = G1 + G2

G1 = 1/2absin(c)
= 0.5 x 3 x 0.5 x sin (0.5/3)
= 0.13

G2 = 1/2absin(c)
= 0.5 x 0.5 x 3.5 x sin (0.5/3.5)
= 0.12

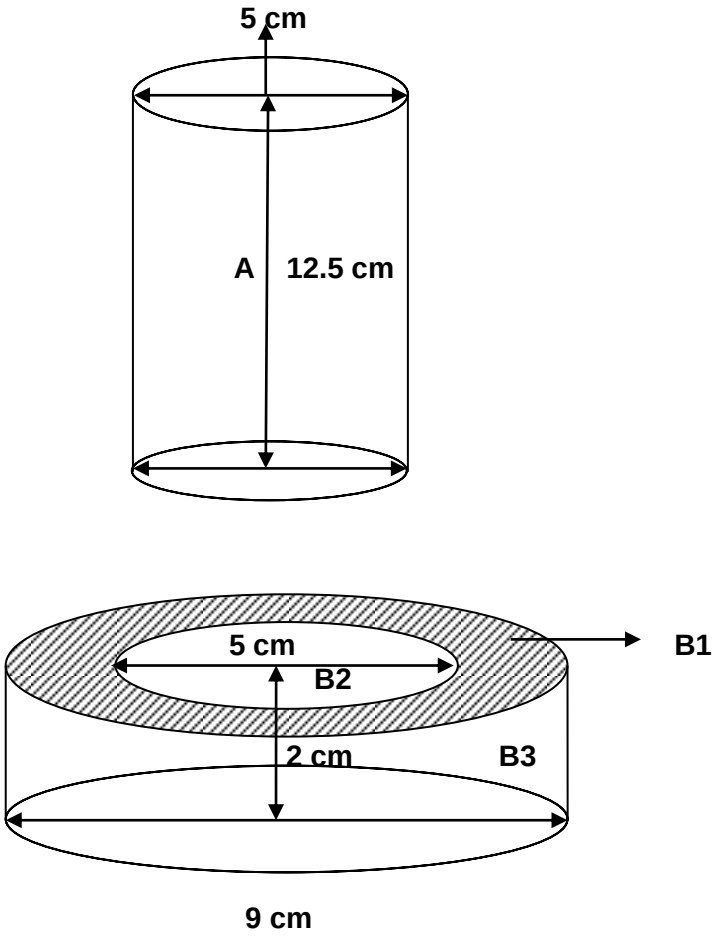
G = G1 + G2
= 0.13 + 0.12
= 0.25

H = l x b

= 2 x 0.5
= 1

A + B + C + D + E + F + G + H (12 no's)
= 21.72 + 6.15 + 8.03 + 6 + 5 + 0.6 + 0.25 + 1
= 48.75
= 585

Blade holder:



**C3**

**9 cm**

A = 2πrh
= 2 x 3.14 x 5 x 12.5
= 392.5

B = B1 - B2 + B3

B1 = $\pi r^2$
= 3.14 x $4.5^2$
= 63.59

B2 = $\pi r^2$
= 3.14 x $2.5^2$
= 19.63

B3 = 2πrh
= 2 x 3.14 x 4.5 x 9
= 254.34

B = B1 - B2 + B3
= 63.59 + 19.63 + 254.34
= 298.3

C = C1 - C2 + C3

C1 = $\pi r^2$
= 3.14 x $4.5^2$
= 63.59

C2 = $\pi r^2$
= 3.14 x $2^2$
= 12.56

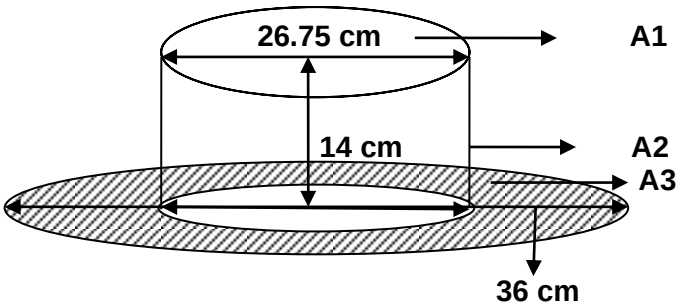
C3 = 2πrh

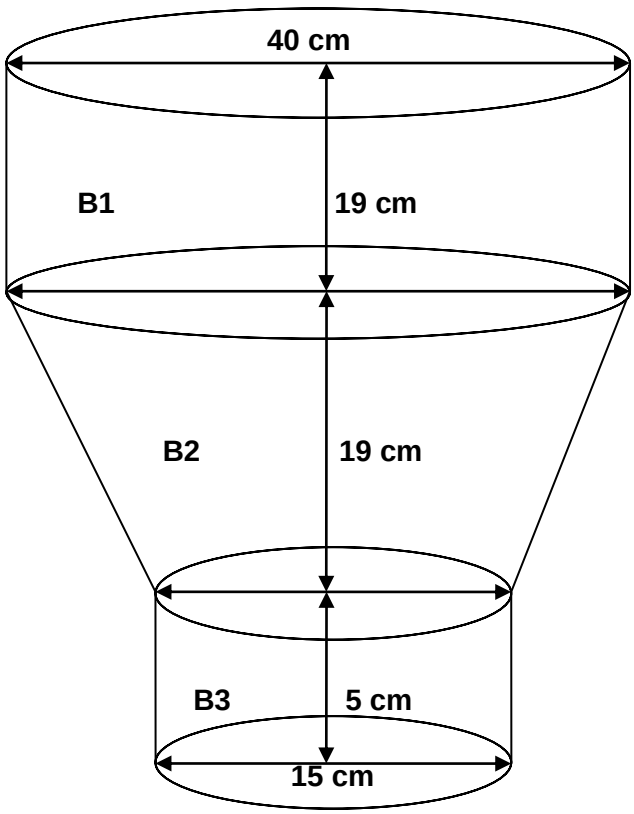
= 2 x 3.14 x 4.5 x 10.5
= 296.73

C = C1 - C2 + C3
= 63.59 - 12.56 + 296.73
= 347.76

A + B + C
= 392.5 + 298.3 + 347.76
= 1038.56

Outer Hopper:



A = A1 + A2 + (A3-A1)

A1 = $\pi r^2$
= 3.14 x $13.38^2$
= 562.14

A2 = 2πrh
= 2 x 3.14 x 13.38 x 14
= 1176.37

A3 = $\pi r^2$
= 3.14 x $18^2$
= 1017.36

A = A1 + A2 + (A3-A1)
= 562.14 + 1176.37 + (1017.36 - 562.14)
= 2193.73

B = B1 + B2 + B3

B1 = 2πrh
= 2 x 3.14 x 20 x 19
= 2386.4

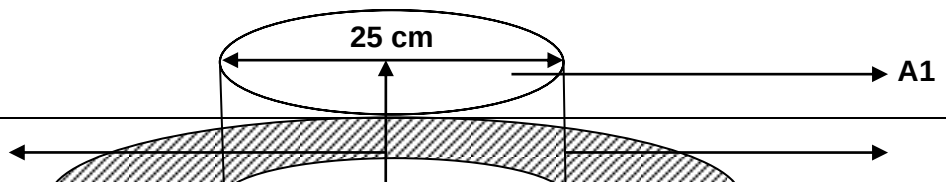
B2 = $\pi$ x (r1+r2) x $(h^2 + (r1-r2)^2)^{1/2}$
= 3.14 x (20 + 7.5) x $(19^2 + (20 - 7.5)^2)^{1/2}$
= 1963.6

B3 = 2πrh
= 2 x 3.14 x 7.5 x 5
= 235.5

B = B1 + B2 + B3
= 2386.4 + 1963.6 + 235.5
= 4585.5

A+B
= 2193.73 + 4585.5
= 6779.23

Plate:

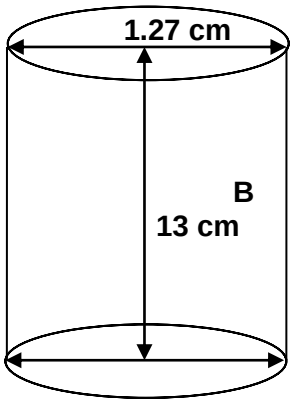


**1 cm** **A2**

**A3**

**1.15 cm** **A4**

**28 cm**




A = A1 + A2 + A3

A1 = $\pi r^2$ (outer surface+ inner surface)
= 3.14 x $12.5^2$
= 490.63
= 490.63 x 2
= 981.25

A2 = 2πrh
= 2 x 3.14 x 12.5 x 1
= 78.5

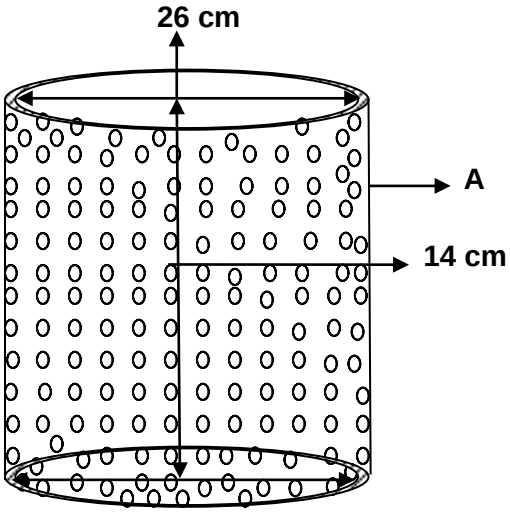
A3 = $\pi r^2$
= 3.14 x $14^2$
= 615.44

A = A1 + A2 + A3
= 981.25 + 78.5 + 615.44
= 1675.19

B = 2πrh
= 2 x 3.14 x 1.27 x 13
= 103.68

A + B
= 1675.19 + 103.68
= 1778.87

Screen:




A = 2πrh
= 2 x 3.14 x 13 x 14
= 1142.96

1linear inch perpendicular to the screen surface placed on plain surface with a pose of cylindrical contains 11 pores.

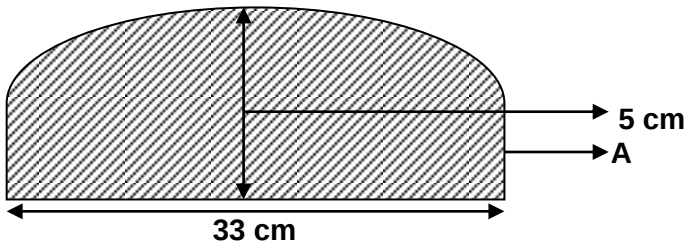
Each pore size = 0.5 mm
For 11 pores = 11 x 0.5
= 5.5 mm (0.55 cm)
1142.96 $cm^2$ surface area in inches = 1142.96/2.54
= 449.98
449.98 $cm^2$ surface area contains void space of = 449.98 x 0.55
= 247.49
= 247 x 2.54
= 628.62 $cm^2$
Total intact surface of the screen = 1142.96 - 628.62
= 514.34 $cm^2$

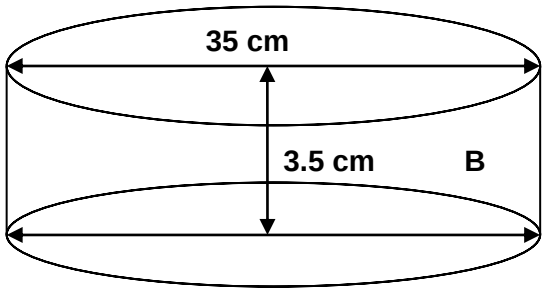
2 surfaces (interior and exterior) = 514.34 x 2
= 1028.68 $cm^2$

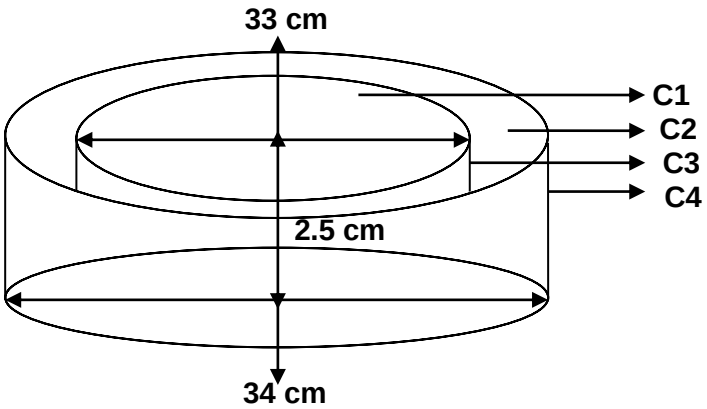
Multimill = A + (A+B+C+D+E+F+G+H+I+J) + (A+B+C+D+E+F+G+H) +
(A+B+C+D+E+F+G+H) + (A+B+C) + (A+B) + (A+B) + Screen
= 1374.5 + 1937.17 + 112.06 + 585 + 1038.56 + 6779.23 + 1778.87
+ 1028.68
= 14634.07 $cm^2$

## SQUARE BIN(500 KG)

Upper Lid:



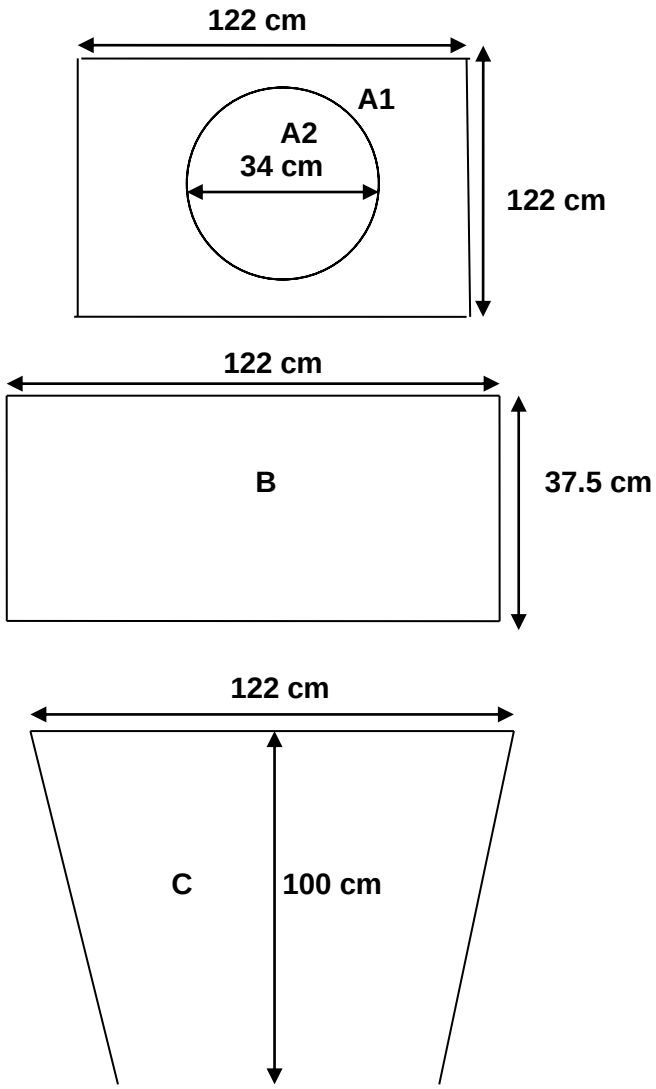

A = 1/2πd$^2$
= 0.5 x 3.14 x 33$^2$
= 1709.73

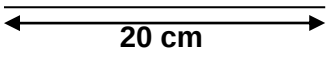
B = 2πrh
= 2 x 3.14 x 17.5 x 3.5
= 384.65

C = C2 - C1 + C3 + C4

C1 = $\pi r^2$
= 3.14 x $16.5^2$
= 854.87
C2 = $\pi r^2$
= 3.14 x $17^2$
= 907.46
C3 = 2πrh
= 2 x 3.14 x 16.5 x 2.5
= 259.05
C4 = 2πrh
= 2 x 3.14 x 17 x 2.5
= 266.9
C = C2 - C1 + C3 + C4
= 907.46 - 854.87 + 259.05 + 266.9
= 578.54
A+ B + C
= 1709.73 + 384.65 + 578.54
= 2672.92

Body:






A = A1 - A2

A1 = l x b
= 122 x 122
= 14884

A2 = $\pi r^2$
= 3.14 x $17^2$
= 907.46

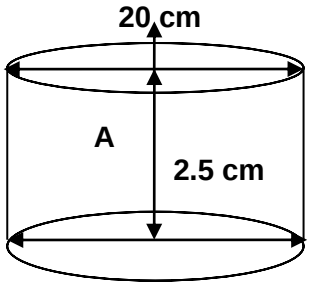
A = A1 - A2
= 14884 - 907.46
= 13976.54

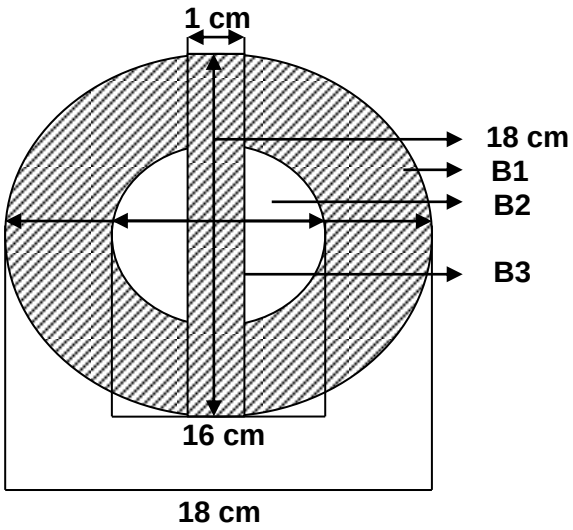
B = l x b (4 no's)
= 122 x 37.5
= 4575
= 4575 x 4
= 18300

C = ½(a+b) h (4 no's)
= 0.5(20+122)100
= 7100
= 7100 x 4
= 28400

A + B + C
=13976.54 + 18300 + 28400
= 60676.54

<u>Lower lid</u>:






A = 2πrh
= 2 x 3.14 x 10 x 2.5
= 157

B = B1 + B2 + B3

B1 = $\pi r^2$
= 3.14 x $9^2$
= 254.34

B2 = $\pi r^2$
= 3.14 x $8^2$
= 200.96

B3 = 2πrh
= 2 x 3.14 x 0.5 x 18
= 56.52

B = B1 + B2 + B3
= 254.34 + 200.96 + 56.52
= 511.82

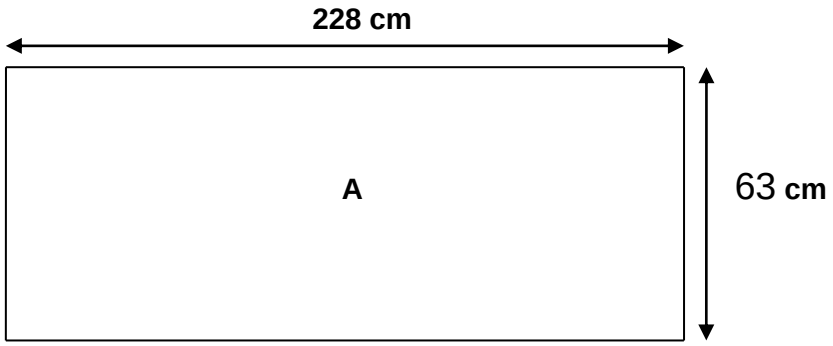
A+B
= 157 + 511.82
= 668.82

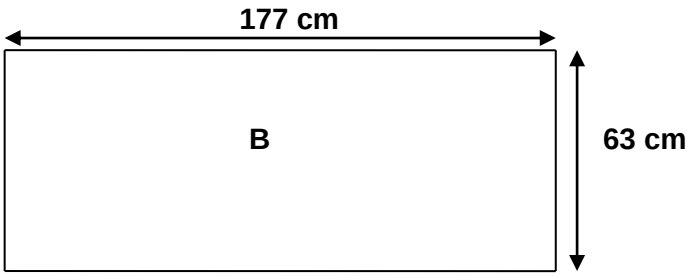
Square Bin (500 kg) = (A+B+C) + (A+B+C) + (A+B)

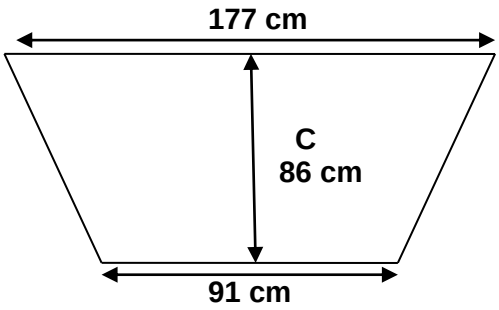
= 2672.92 + 60676.54 + 668.82
= 64018.28 cm²

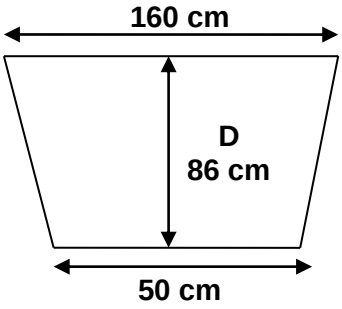
## OCTAGONAL BLENDER

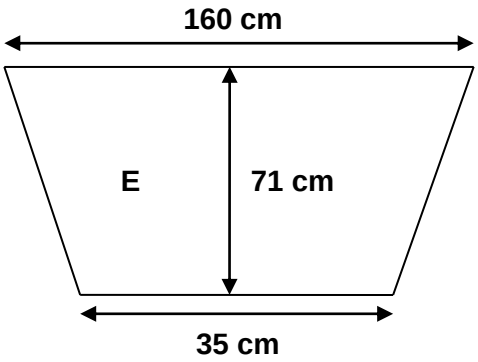
Main Body:

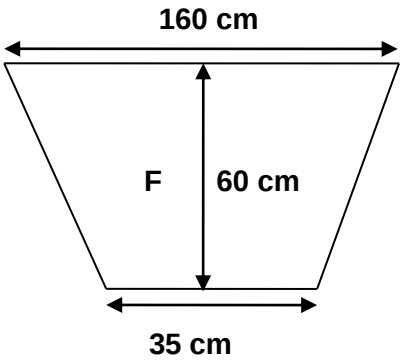





A = l x b (2 no's)
= 228 x 63
= 14364
= 14364 x 2
= 28728

B = l x b (2 no's)
= 177 x 63
= 11151
= 11151 x 2
= 22302

C = ½(a+b) h (2 no's)
= 0.5(177+91) 86
= 11524
= 11524 x 2
= 23048

D = ½(a+b) h (2 no's)
= 0.5(160+50) 86
= 9030
= 9030 x 2
= 18060

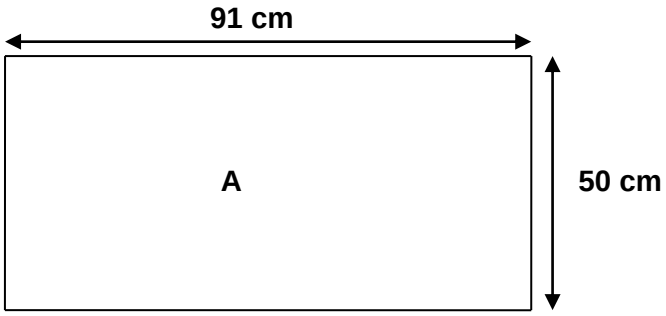
E = ½(a+b) h (2 no's)
= 0.5(160+35)71

= 6922
= 6922 x 2
= 13845

F = ½(a+b) h (2 no's)
= 0.5(160+35) 60
= 5860
= 5860 x 2
= 11700

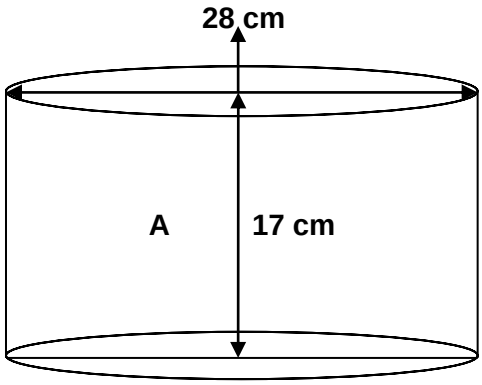
A + B + C + D + E + F
= 28728 + 22302 + 23048 + 18060 + 13845 + 11700
= 117683

Rectangular window with gasket:



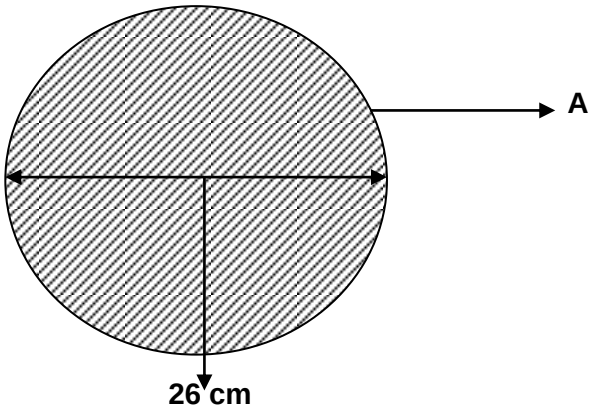

A = l x b
= 85 x 45
= 3825

Lid:




A = 2πrh
= 2 x 3.14 x 14 x 17
= 1494.64

Butterfly Valve:

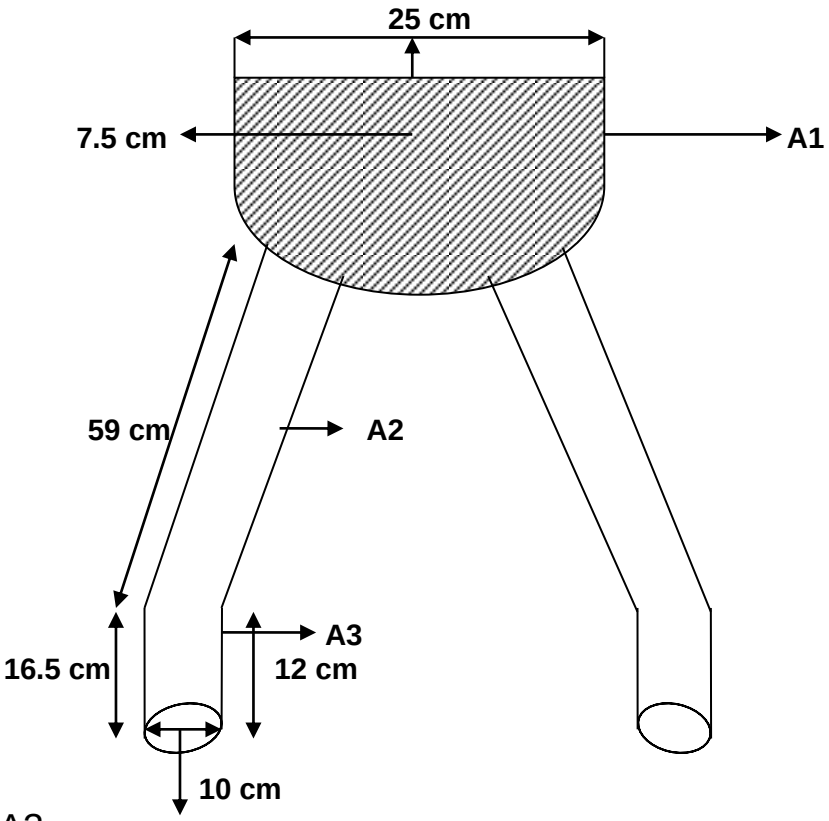



A = $\pi r^2$ (Inner + Outer surface)
= 3.14 x $13^2$
= 530.66
= 530.66 x 2
= 1061.32

Octagonal Blender = (A+B+C+D+E+F) + A + A + A
= 117683 + 3825 + 1494 + 1061
= 124063 $cm^2$

## COMPRESSION MACHINE(55 st-D)

Y-Chute:




A = A1 + A2 + A3

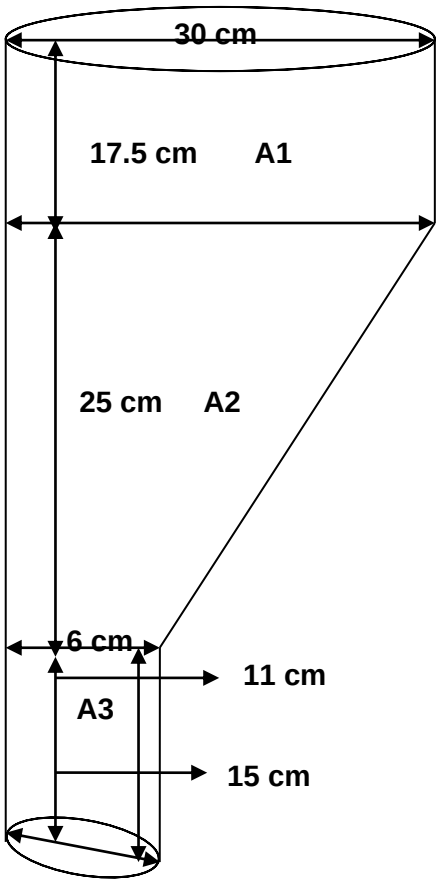
A1 = $1/2\pi d^2$
= 0.5 x 3.14 x $25^2$
= 981.25

A2 = 2πrh (2 no's)
= 2 x 3.14 x 5 x 59
= 1852.6
= 1852.6 x 2
= 3705.2

A3 = 2πr (1/2(h1+h2) (2 no's)
= 2 x 3.14 x 5 (0.5(16.5+12)
= 447.45
= 447.45 x 2
= 894.9

A = A1 + A2 + A3
= 981.25 + 3705.2 + 894.9
= 5581.35

Hopper:




A = A1 + A2 + A3

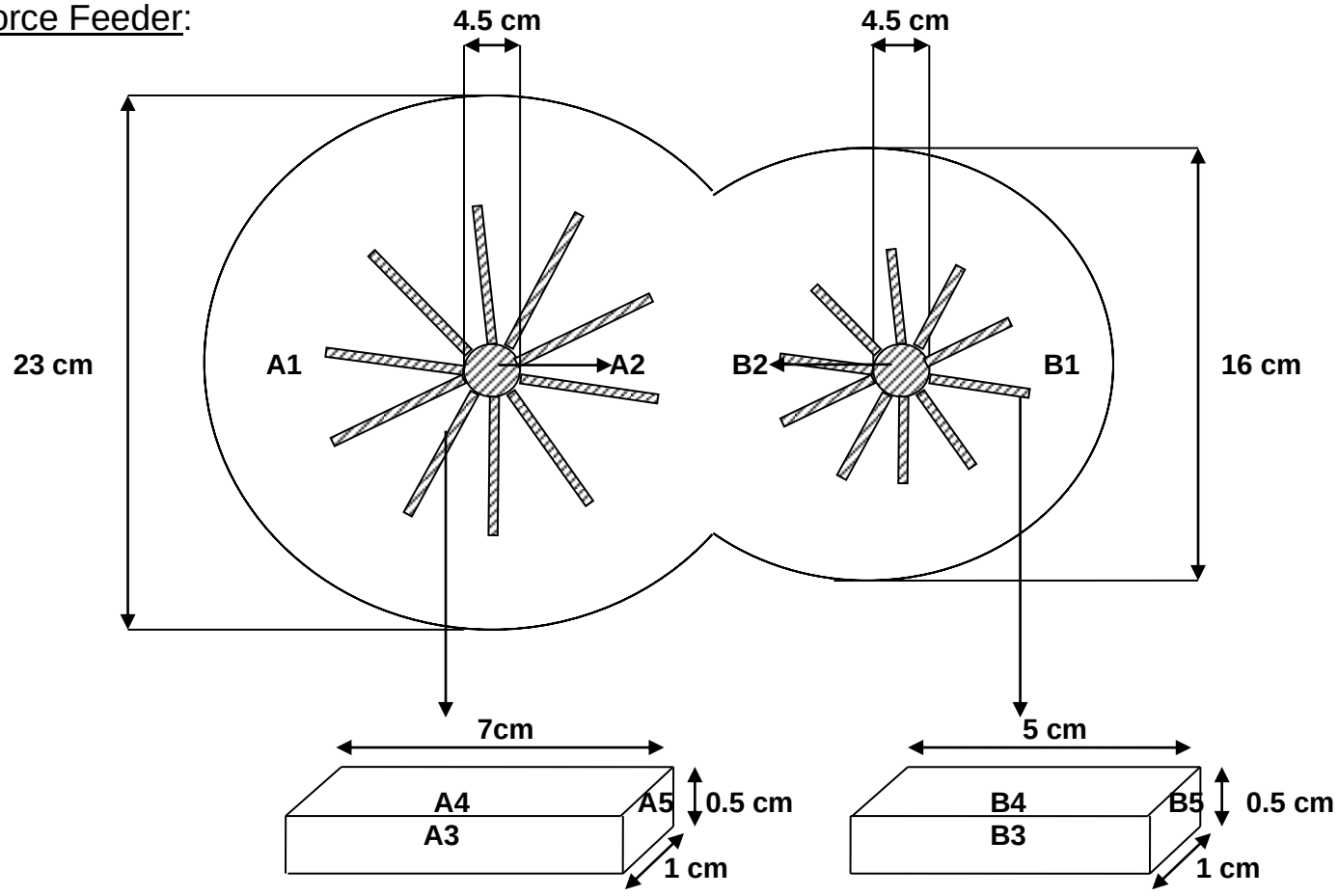
A1 = 2πrh
= 2 x 3.14 x 15 x 17.5
= 1648.5

A2 = π x (r1+r2) x $(h^2+ (r1-r2)^2)^{1/2}$
= 3.14 x (30+3) x $(25.5^2 + (30-3)^2)^{1/2}$
= 3812.88

A3 = 2πr (1/2(h1+h2)
= 2 x 3.14 x 3(0.5(15+11)
= 244.92

A = A1 + A2 + A3 (2 no's)
= (1648.5 + 3812.88 + 244.92) 2
= 11412.6

Force Feeder:




A = A1 + A2

A1 = $\pi r^2$ (2 inner surfaces)
= 3.14 x $11.5^2$
= 415.27
= 415.27 x 2
= 830.54

A2 = $\pi r^2$ (upper + lower surface)
= 3.14 x $2.25^2$
= 15.90
= 15.90 x 2
= 31.8

A3 = l x b (2 parallel surfaces + 11 no's)
= 7 x 0.5
= 3.5
= 3.5 x 13
= 45.5

A4 = l x b (2 parallel surfaces + 11 no's)
= 7 x 1
= 7
= 7 x 13
= 91

A5 = l x b (2 parallel surfaces + 11 no's)
= 1 x 0.5
= 0.5
= 0.5 x 13
= 6.5

B1 = $\pi r^2$ (2 inner surfaces)
= 3.14 x $8^2$
= 200.96
= 200.96 x 2
= 401.92

B2 = $\pi r^2$ (upper + lower surface)
= 3.14 x $2.25^2$
= 15.90
= 15.90 x 2
= 31.8

B3 = l x b (2 parallel surfaces + 11 no's)
= 5 x 0.5
= 2.5

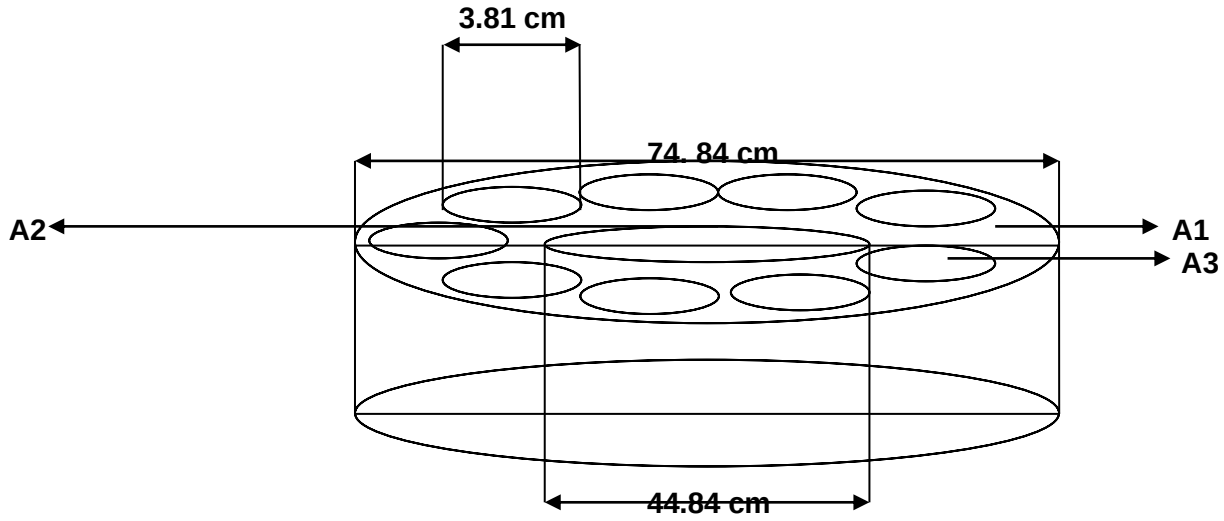
= 2.5 x 13
= 32.5

B4 = l x b (2 parallel surfaces + 11 no's)
= 5 x 1
= 5
= 5 x 13
= 65

B5 = l x b (2 parallel surfaces + 11 no's)
= 1 x 0.5
= 0.5
= 0.5 x 13
= 6.5

A + B = (A1 + A2 + A3 + A4 + A5) + (B1 + B2 + B3 + B4 + B5) (2 no's)
= ((830.54+31.8+45.5+91+6.5) + (401.92+31.8+32.5+65+6.5)) 2
= 3086.12

Turret:




A = A1 - A2 - A3

A1 = $\pi r^2$
= 3.14 x $37.42^2$

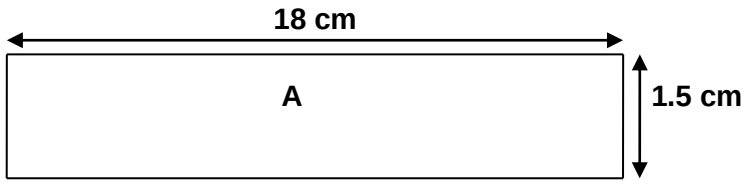
= 4396.81

$A2 = \pi r^2$
$= 3.14 \times 22.42^2$
$= 1578.24$

$A3 = \pi r^2$ (55 no's)
$= 3.14 \times 1.91^2$
$= 11.46$
$= 11.46 \times 55$
$= 630.3$

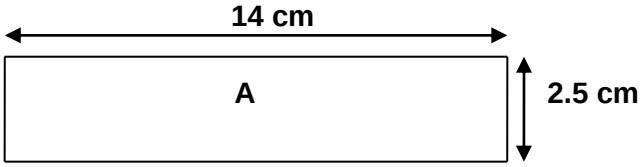
$A = A1 - A2 - A3$
$= 4396.81 - 1578.24 - 630.3$
$= 2188.27$

Scrapper Plate:

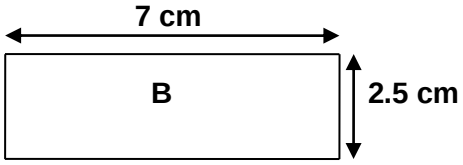


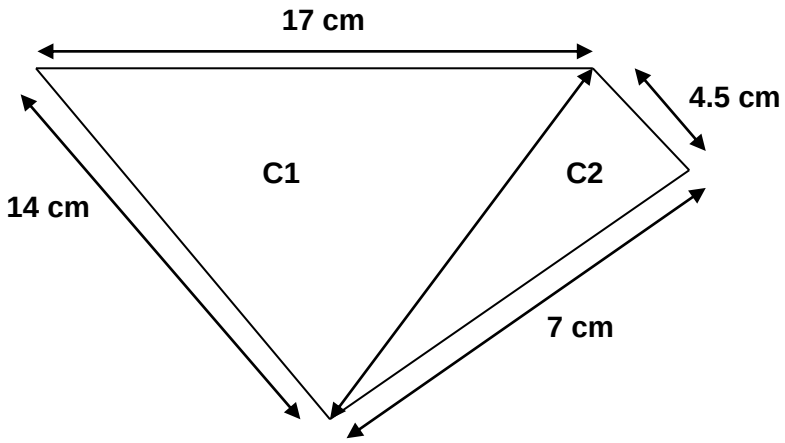

A = l x b (2 no's)
= 18 x 1.5
= 27
= 27 x 2
= 54

Ejection Plate:








A = l x b
= 14 x 2.5
= 35

B = l x b
= 7 x 2.5
= 17.5

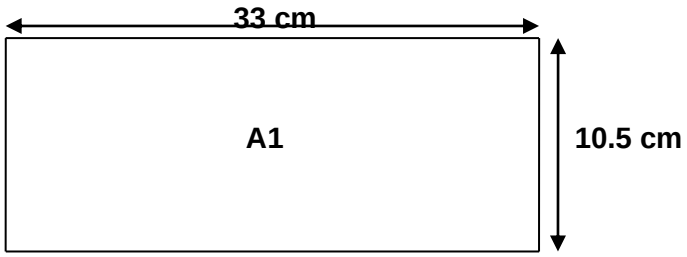
C = C1 + C2

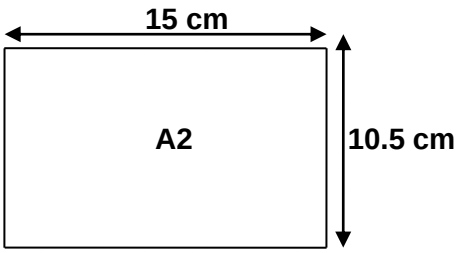
C1 = 1/2absin(c)
= 0.5 x 17 x 14 x sin (14/17)
= 86.87

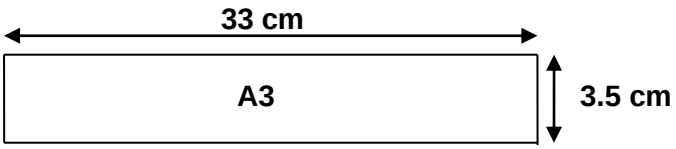
C2 = 1/2absin(c)
= 0.5 x 7 x 4.5 x sin (4.5/7)
= 9.45

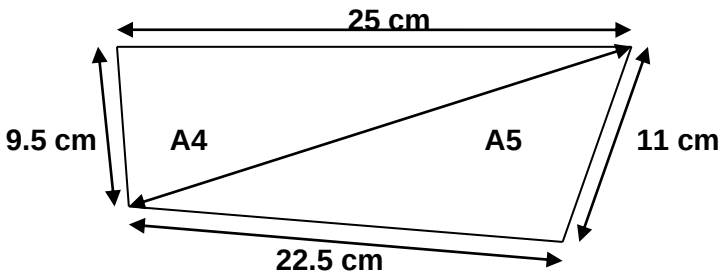
A+B+C (2 no's)
= (35+17.5+ (86.87+9.45)) 2
= 297.64

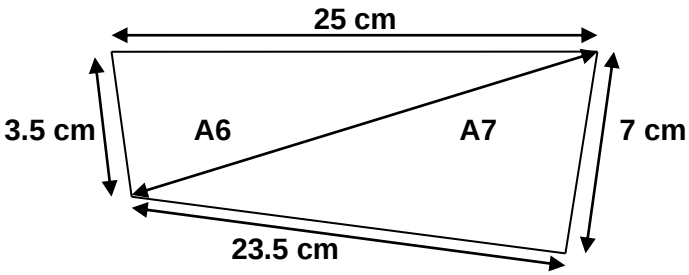
Discharge Chute:






A = A1 + A2 + A3 + A4 + A5 + A6 + A7

A1 = l x b
= 33 x 10.5
= 346.5

A2 = l x b
= 15 x 10.5

= 157.5

A3 = l x b (2 no's)
= 33 x 3.5
= 115.5
= 115.5 x 2
= 231

A4 = 1/2absin(c)
= 0.5 x 25 x 9 x sin (9/25)
= 39.38

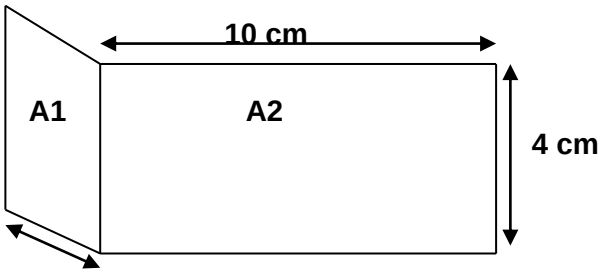
A5 = 1/2absin(c)
= 0.5 x 22.5 x 11 x sin (11/22.5)
= 58.16

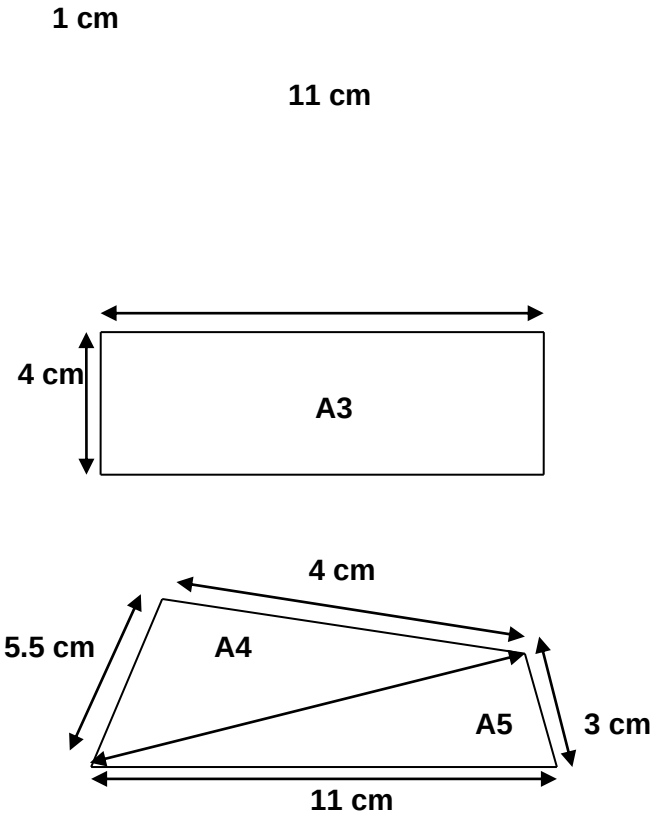
A6 = 1/2absin(c) (2 no's)
= 0.5 x 25 x 3.5 x sin (3.5/25)
= 6.13
= 6.13 x 2
= 12.26

A7 = 1/2absin(c)(2 no's)
= 0.5 x 23.5 x 7 x sin (7/23.5)
= 23.85
= 23.85 x 2
= 47.70

A = A1 + A2 + A3 + A4 + A5 + A6 + A7
= 346.5 + 157.5 + 231 + 39.38 + 58.16 + 12.26 + 47.70
= 892.5

Powder Discharge Plate:






A = A1 + A2 + A3 + A4 + A5

A1 = l x b
= 4 x 1
= 4

A2 = l x b
= 10 x 4
= 40

A3 = l x b
= 11 x 4
= 44

A4 = 1/2absin(c) (2 no's)
= 0.5 x 5.5 x 4 x sin (4/5.5)
= 7.37
= 7.37 x 2
= 14.74

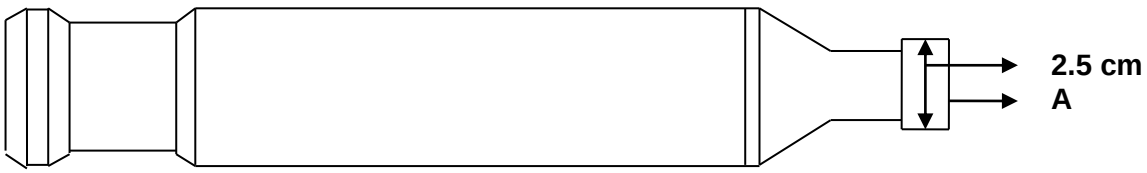
A5 = 1/2absin(c) (2 no's)
= 0.5 x 11 x 3 x sin (3/11)
= 4.46
= 4.46 x 2

= 8.92

A = A1 + A2 + A3 + A4 + A5 (2 no's)
= 4 + 40 + 44 + 14.74 + 8.92
= 111.66
= 111.66 x 2
= 223.32

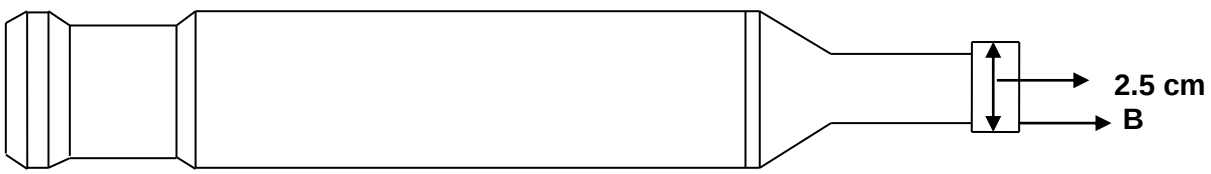
Punch:

Upper:




A = $\pi r^2$ (55 no's)
= 3.14 x $1.25^2$
= 4.91
= 4.91 x 55
= 269.84

Lower:

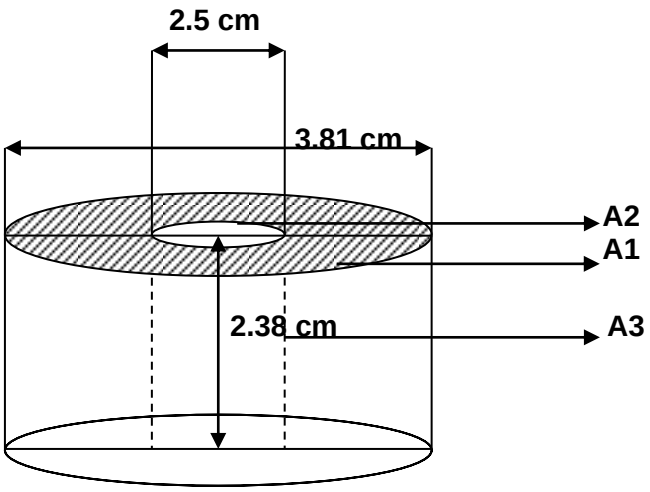



B = $\pi r^2$

$= 3.14 \times 1.25^2$
$= 4.91$
$= 4.91 \times 55$
$= 269.84$

A + B
= 269.84 + 269.84
= 539.68

Die:




A = A1 - A2 + A3

$A1 = \pi r^2$
$= 3.14 \times 1.91^2$
$= 11.46$

$A2 = \pi r^2$
$= 3.14 \times 1.25^2$
$= 4.9$

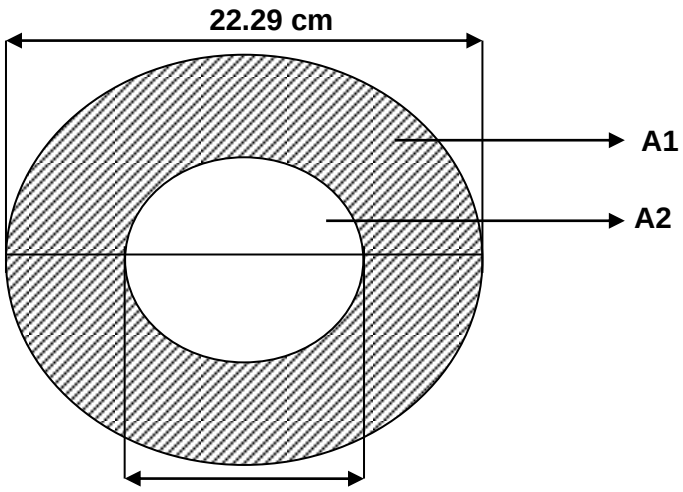
$A3 = 2\pi rh$
$= 2 \times 3.14 \times 1.25 \times 2.38$
$= 18.68$

A = A1 - A2 + A3 (55 no's)
= 11.46- 4.9 + 18.68
= 25.24
= 25.24 x 55
= 1388.2

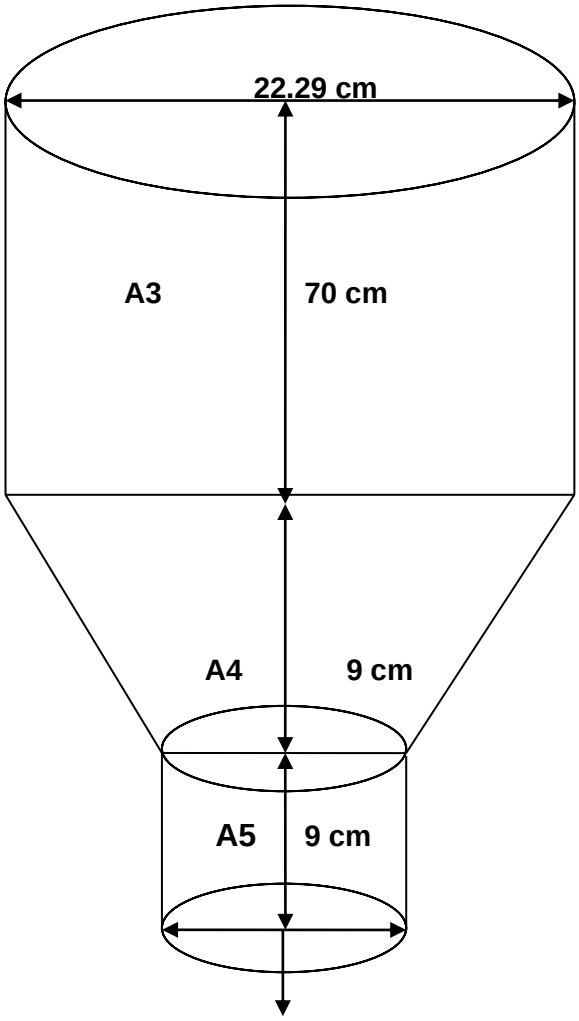
Compression machine (55 st-D) = A + A + (A+B) + A + A + (A+B+C) + A + A + (A+B) + A
= 5581.35 + 11412.6 + 3086.12 + 2188.27 + 54 + 297.64 + 892.5 + 223.32 + 539.68 + 1388.2
= 25663.68 $cm^2$

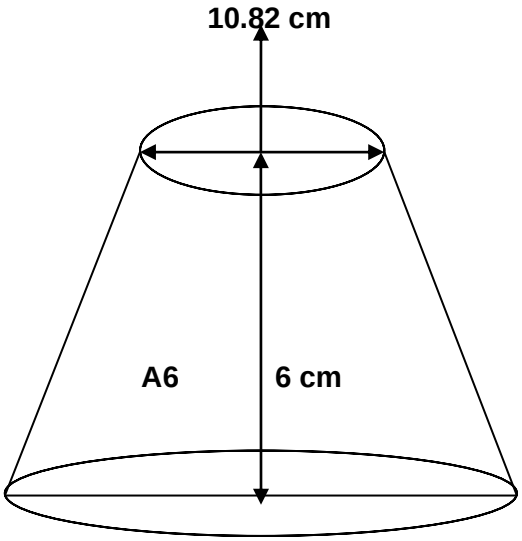
## PRODUCT CONVEY MACHINE

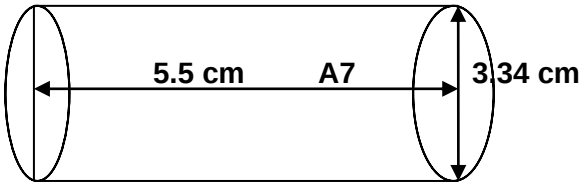
Hopper:



18.69 cm






A = A1 - A2 + A3 + A4 + A5 + A6 + A7

A1 = $\pi r^2$
= 3.14 x $11.15^2$
= 390.27

A2 = $\pi r^2$
= 3.14 x $9.35^2$
= 274.51

A3 = 2πrh
= 2 x 3.14 x 11.15 x 70
= 4901.54

A4 = π x (r1+r2) x $(h^2+ (r1-r2)^2)^{1/2}$
= 3.14 x (11.15+5.41) x $(9^2 + (11.15-5.41)^2)^{1/2}$
= 555.06

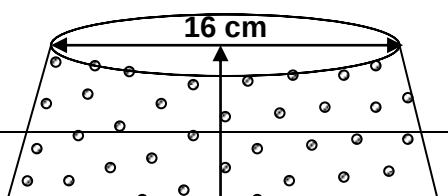
A5 = 2πrh
= 2 x 3.14 x 5.41 x 9
= 305.77

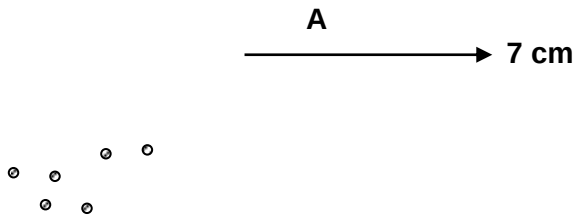
A6 = π x (r1+r2) x $(h^2+ (r1-r2)^2)^{1/2}$
= 3.14 x (10.15+5.41) x $(6^2 + (10.15-5.41)^2)^{1/2}$
= 373.59

A7 = 2πrh
= 2 x 3.14 x 1.67 x 5.5
= 57.68

A = A1 - A2 + A3 + A4 + A5 + A6 + A7
= 390.27 - 274.51 + 4901.54 + 555.06 + 305.77 + 373.59 + 57.68
= 6309.4

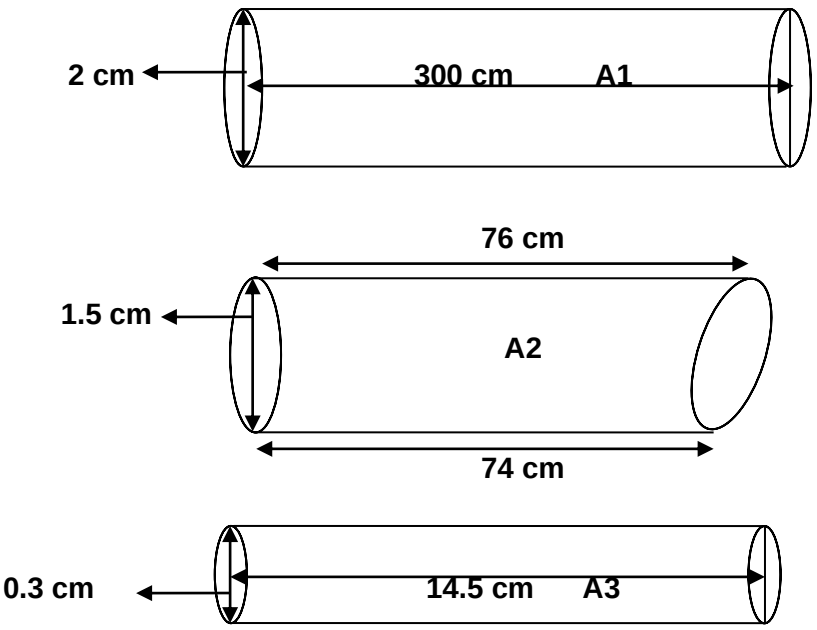
Filter Bag:






$A = \pi \times (r1+r2) \times (h^2 + (r1-r2)^2)^{1/2}$
$= 3.14 \times (12.5 + 8) \times (7^2 + (12.5-8)^2)^{1/2}$
$= 535.67$

Tubes:




$A = A1 + A2 + A3$

$A1 = 2\pi rh$
$= 2 \times 3.14 \times 1 \times 300$
$= 1884$

$A2 = 2\pi r (1/2(h1+h2))$
$= 2 \times 3.14 \times 0.75 (0.5(76+74))$
$= 353.25$

$A3 = 2\pi rh$ (2 no's)
$= 2 \times 3.14 \times 0.15 \times 14.5$
$= 13.66$

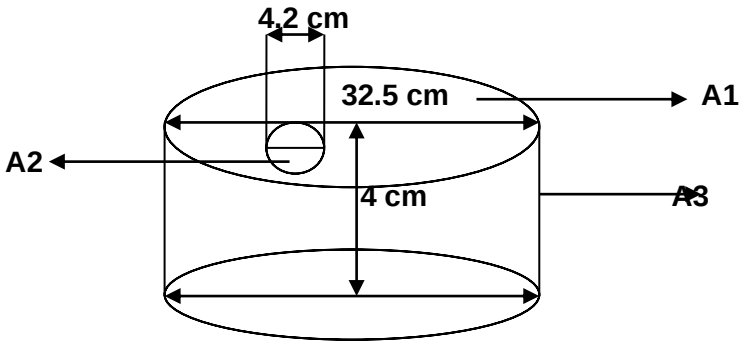
= 13.66 x 2
= 27.32

A = A1 + A2 + A3
= 1884 + 353.25 + 27.32
= 2264.57

Product convey machine = A + A + A (2 no's)
= (6309.4 + 535.67 + 2264.57) x 2
= 18219.28 $cm^2$

## DEDUSTER

Main Body:




A = A1 - A2 + A3

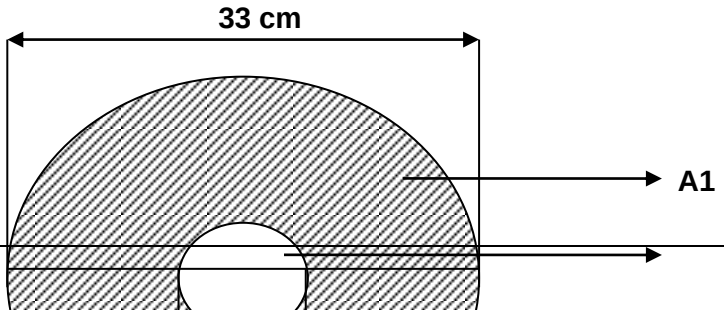
A1 = $\pi r^2$
= 3.14 x $16.25^2$
= 829.16

A2 = $\pi r^2$
= 3.14 x $2.1^2$
= 13.85

A3 = $2\pi rh$
= 2 x 3.14 x 16.25 x 4
= 408.2

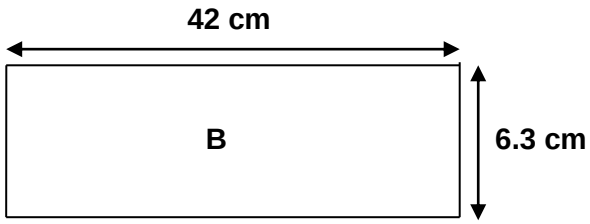
A = A1 - A2 + A3
= 829.16 - 13.85 + 408.2
= 1223.51

Top Lid:



**A2**

**8 cm**




A = A1 - A2

A1 = $\pi r^2$
= 3.14 x $16.5^2$
= 854.87

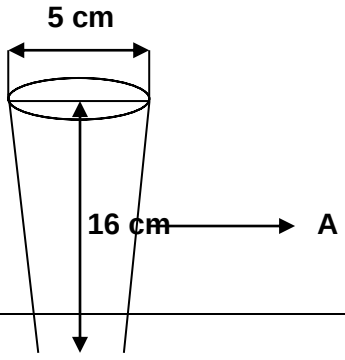
A2 = $\pi r^2$
= 3.14 x $4^2$
= 50.24

A = A1 - A2
= 854.87 - 50.24
= 804.63

B = l x b
= 42 x 6.3
= 264.6

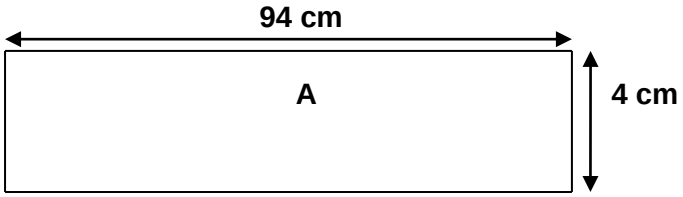
A + B
= 804.63 + 264.6
= 1069.23

Exit Chute:




$A = \pi \times (r1+r2) \times (h^2 + (r1-r2)^2)^{1/2}$
$= 3.14 \times (2.5+2.1) \times (16^2 + (2.5-2.1)^2)^{1/2}$
$= 231.18$

Spiral Helix:

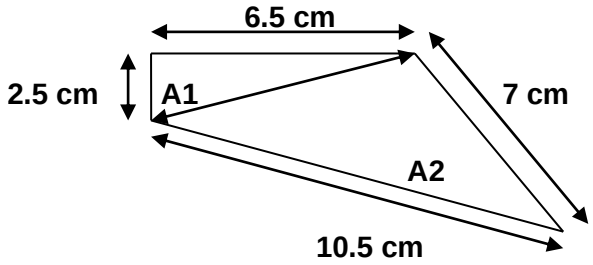


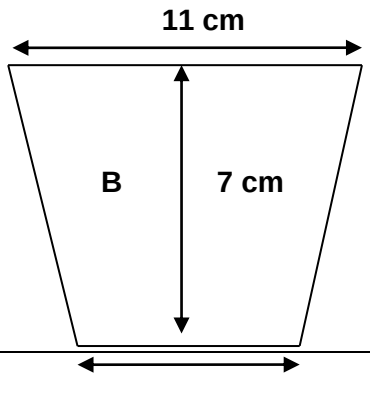

$A = l \times b$
$= 94 \times 4$
$= 376$

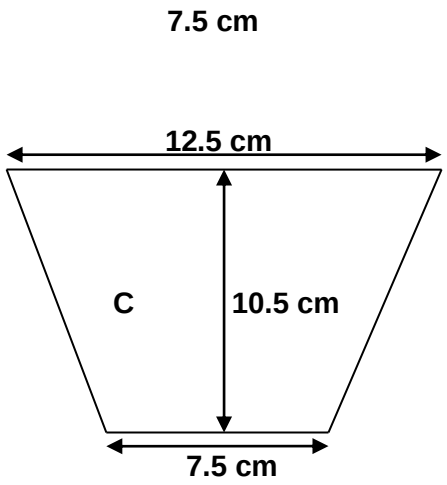
Deduster = (A + (A+B) + A + A) (2 no's)
= (1223.51 + 1069.23 + 231.18 + 376)2
= 5799.84 $cm^2$

## METAL DETECTOR

In-feed Chute:






A = A1 + A2

A1 = 1/2absin(c)
= 0.5 x 6.5 x 2.5 x sin (2.5/6.5)
= 3.09

A2 = 1/2absin(c)
= 0.5 x 10.5 x 7 x sin (7/10.5)
= 22.79

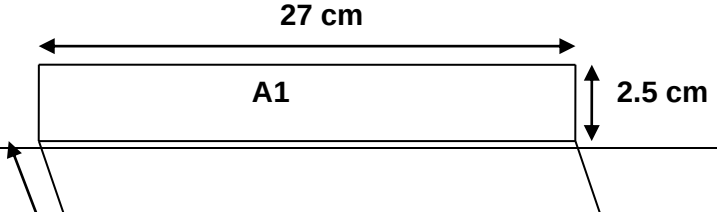
A = A1 + A2 (2 no's)
= 3.09 + 22.79
= 25.88
= 25.88 x 2
= 51.76

B = ½(a+b) h
= 0.5 x (11+7.5) x 7
= 64.75

C = ½(a+b) h
= 0.5 x (12.5+7.5) x 10.5
= 105

A+B+C
= 51.76 + 64.75 + 105
= 221.51

Metal Sensing Path:



**8.5 cm** **A2**

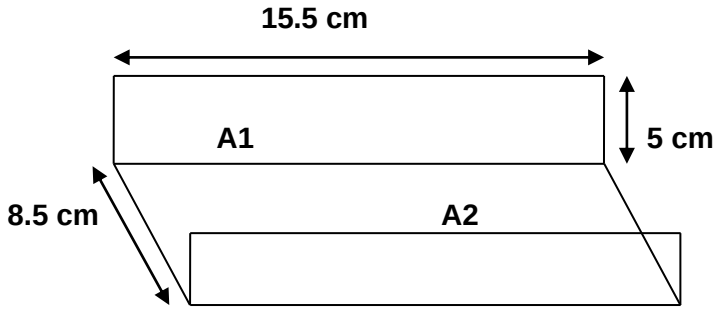
A = A1 + A2

A1 = l x b (2 no's)
= 27 x 2.5
= 67.5
= 67.5 x 2
= 135

A2 = l x b
= 27 x 8.5
= 229.5

A = A1 + A2
= 135 + 229.5
= 364.5

Discharge Chute:




A = A1 + A2

A1 = l x b (2 no's)
= 15.5 x 5
= 77.5
= 77.5 x 2
= 155

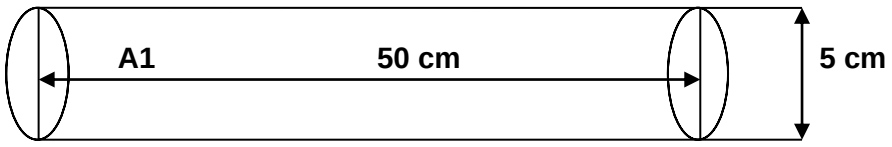
A2 = l x b
= 15.5 x 8.5
= 131.75

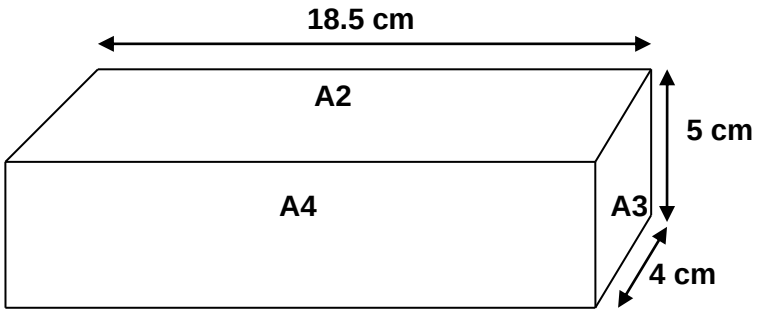
A = A1 + A2
= 155 + 131.75
= 286.75

Metal Detector = (A+B+C) + A + A
= 221.51 + 364.5 + 286.75
= 872.76 $cm^2$

## COATING MACHINE

Spray Gun Assembly:




A = A1 + A2 + A3 + A4

A1 = 2πr(r+h)
= 2 x 3.14 x 2.5(2.5+50)

= 824.25

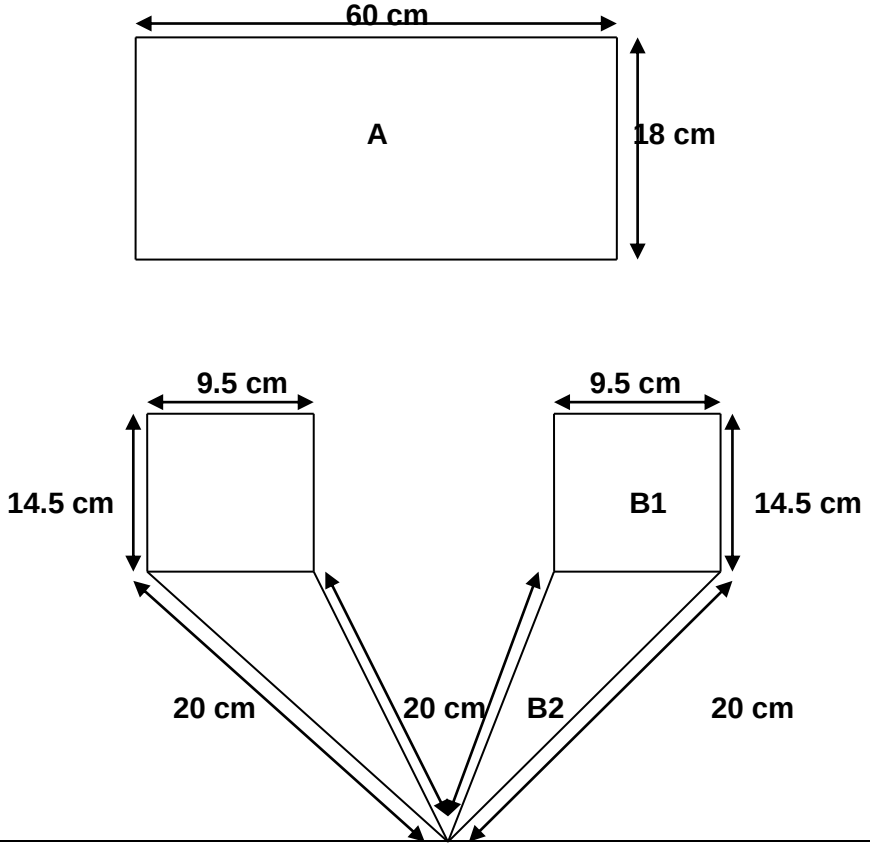
A2 = l x b (2 no's)
= 18.5 x 4
= 74
= 74 x 2
= 148

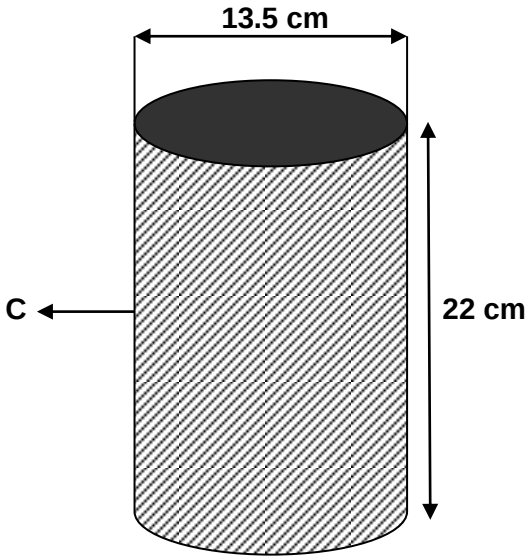
A3 = l x b (2 no's)
= 4 x 5
= 20
= 20 x 2
= 40

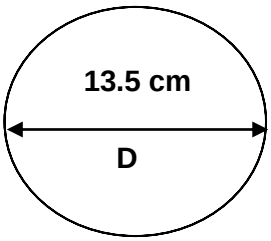
A4 = l x b (2 no's)
= 18.5 x 5
= 92.5
= 92.5 x 2
= 185

A = A1 + A2 + A3 + A4
= 824.35 + 148 + 40 + 185
= 1197.35

Unloading Devices:






A = l x b (2 surfaces)
= 60 x 18
= 1080
= 1080 x 2
= 2160

B = B1 + B2

B1 = l x b (2 no's)
= 14.5 x 9.5
= 137.75
= 137.75 x 2
= 275.5

B2 = sqrt (s(s-a) (s-b) (s-c)) (2 no's)
= sqrt (24.75(24.75-9.5) (24.75-20) (24.75-20))
= 92.28
= 92.28 x 2

= 184.56

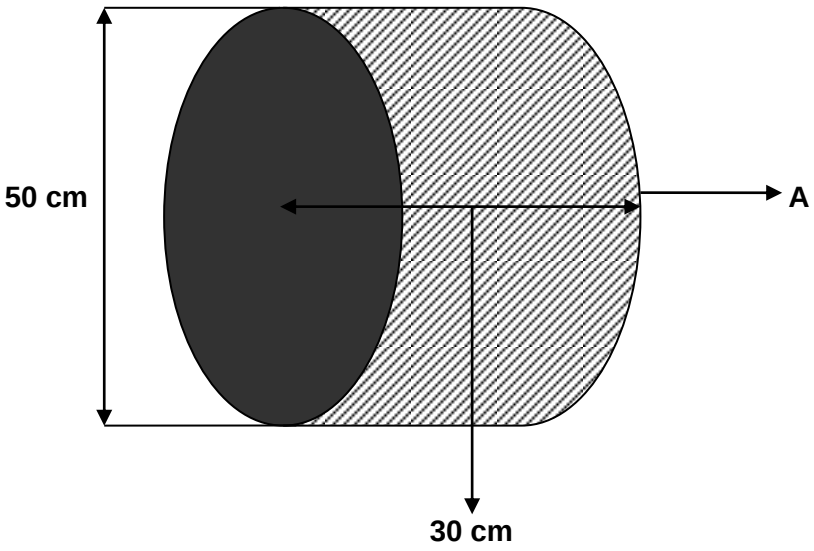
B = B1 + B2
= 275.5 + 184.56
= 460.06

C = 2πrh
= 2 x 3.14 x 6.75 x 22
= 932.58

D = $\pi r^2$
= 3.14 x $6.75^2$
= 143.07

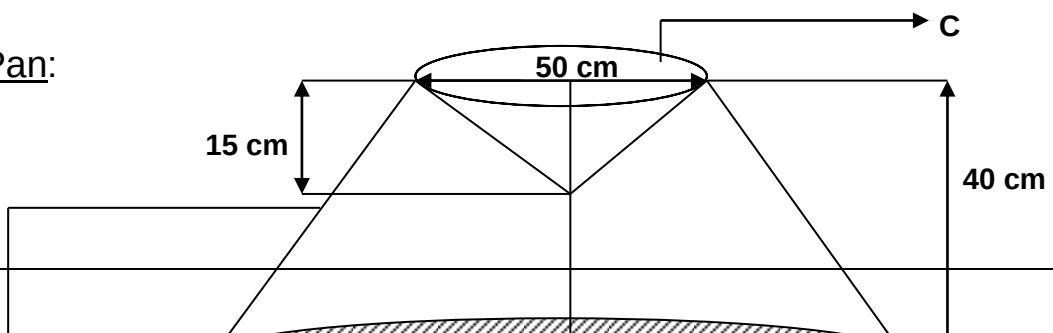
A + B + C + D
= 2160 + 460.06 + 932.58 + 143.07
= 3695.7

Inlet:




A = 2πrh
= 2 x 3.14 x 25 x 30
= 4710

Coating Pan:



**A** **30 cm** **B**

**40 cm**

**50 cm**

**170 cm**

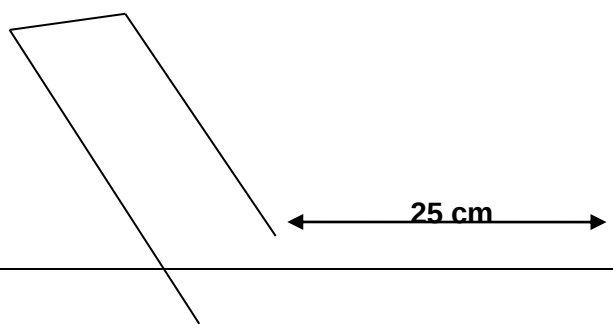
A = π x (r1+r2) x $(h^2+ (r1-r2)^2)^{1/2}$(Anterior chamber + Posterior chamber)
= 3.14 x (85+25) x $(40^2+ (85-25)^2)^{1/2}$
= 24907.15
= 24907.15 x 2
= 49814.3

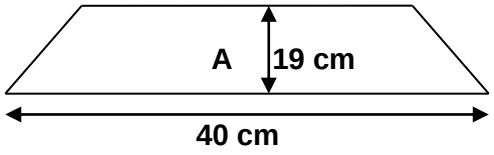
B = 2πrh
= 2 x 3.14 x 85 x 30
= 16014

C = π x r x $(r^2 + h^2)^{1/2}$
= 3.14 x 25 x $(25^2 + 15^2)^{1/2}$
= 2288.65

A + B + C
= 49814.3 + 16014 + 2288.65
= 68116.95

Baffles:



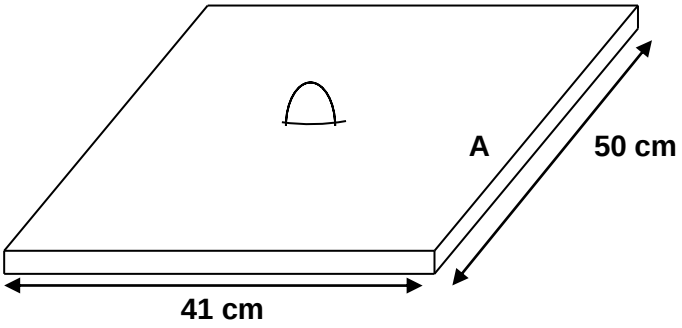


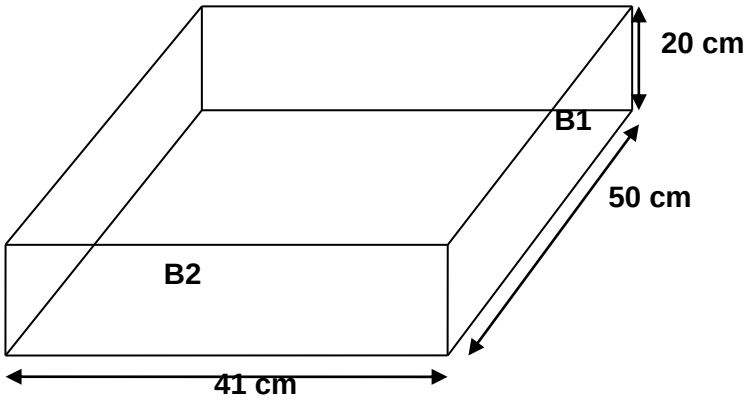

A = ½(a+b) h (Anterior surface + Posterior surface + 2 no's) 8 no's)
= 0.5 x (25+40) 19
= 617.5
= (617.5 x 4) x 8
= 19760

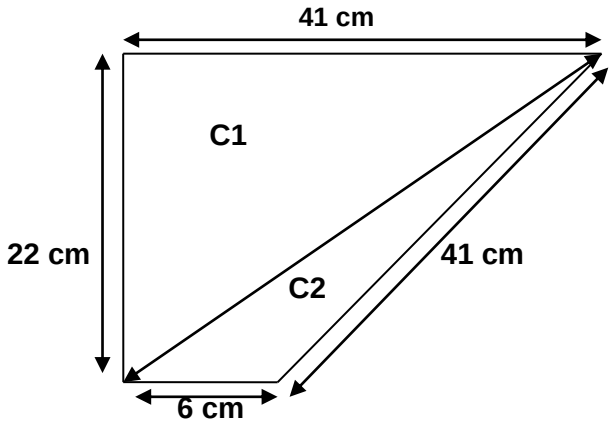
Coating Machine = A + (A+B+C+D) + A + (A+B+C) + A
= 1197.35 + 3695.71 + 4710 + 68116.95 + 19760
= 97480.01 $cm^2$

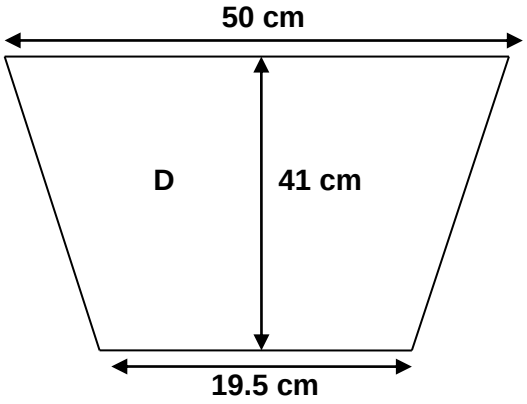
## TABLET/ FILLED CAPSULE SORTER

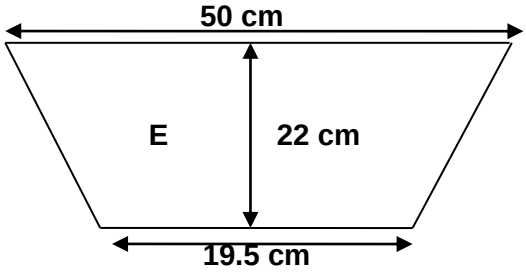
Hopper:

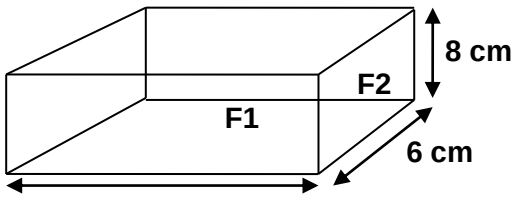



41 cm
C1
22 cm
41 cm
C2
6 cm


50 cm
D
41 cm
19.5 cm


50 cm
E
22 cm
19.5 cm


8 cm
F2
F1
6 cm

**19 cm**

A = l x b
= 41 x 50
= 2050

B = B1 + B2

B1 = l x b (2 no's)
= 50 x 20
= 1000
= 1000 x 2
= 2000

B2 = l x b (2 no's)
= 41 x 20
= 820
= 820 x 2
= 1640

B = B1 + B2
= 2000 + 1640
= 3640

C = C1 + C2

C1 = 1/2absin(c)
= 0.5 x 22 x 41 x sin (22/41)
= 230.55

C2 = 1/2absin(c)
= 0.5 x 41 x 6 x sin (6/41)
= 17.94

C = C1 + C2 (2 no's)
= 230.55 + 17.94
= 248.49
= 248.49 x 2
= 496.98

D = ½(a+b) h
= 0.5 x (50+19.5) x 41
= 1424.75

E = ½(a+b) h
= 0.5 x (50+19.5) x 22
= 764.5

F = F1 + F2

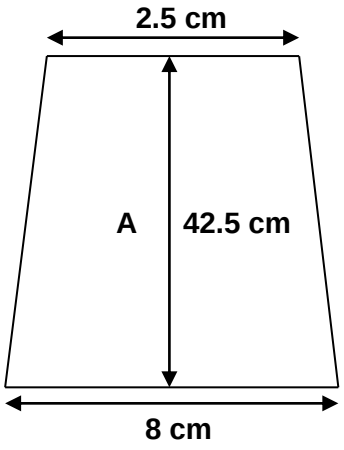
F1 = l x b (2 no's)
= 19 x 8
= 152
= 152 x 2
= 304

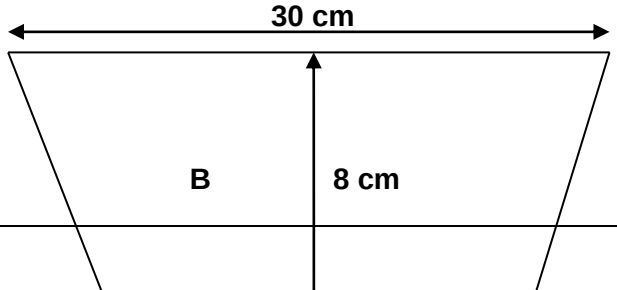
F2 = l x b (2 no's)
= 8 x 6
= 48
= 48 x 2
= 96

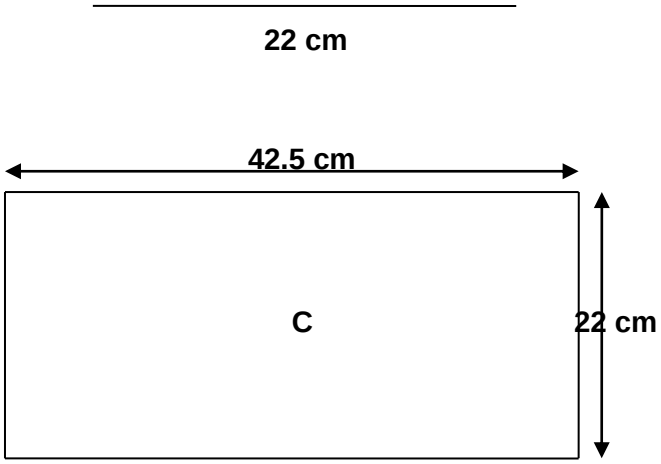
F = F1 + F2
= 304 + 96
= 400

A + B + C + D + E + F
= 2050 + 3640 + 496.98 + 1424.75 + 764.5 + 400
= 8776.23

Vibratory Tray:






A + B + C

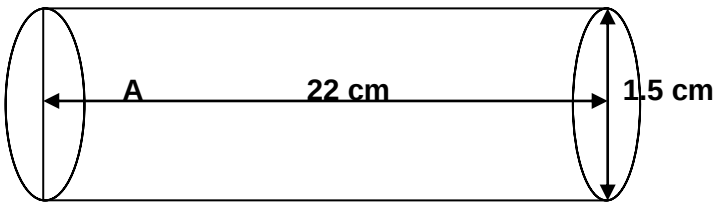
A = ½(a+b) h (2 no's)
= 0.5 x (2.5+8) x 42.5
= 223.13
= 223.13 x 2
= 446.26

B = ½(a+b) h
= 0.5 x (30+22) x 8
= 208

C = l x b
= 42.5 x 22
= 935

A + B + C
= 446.26 + 208 + 935
= 1589.26

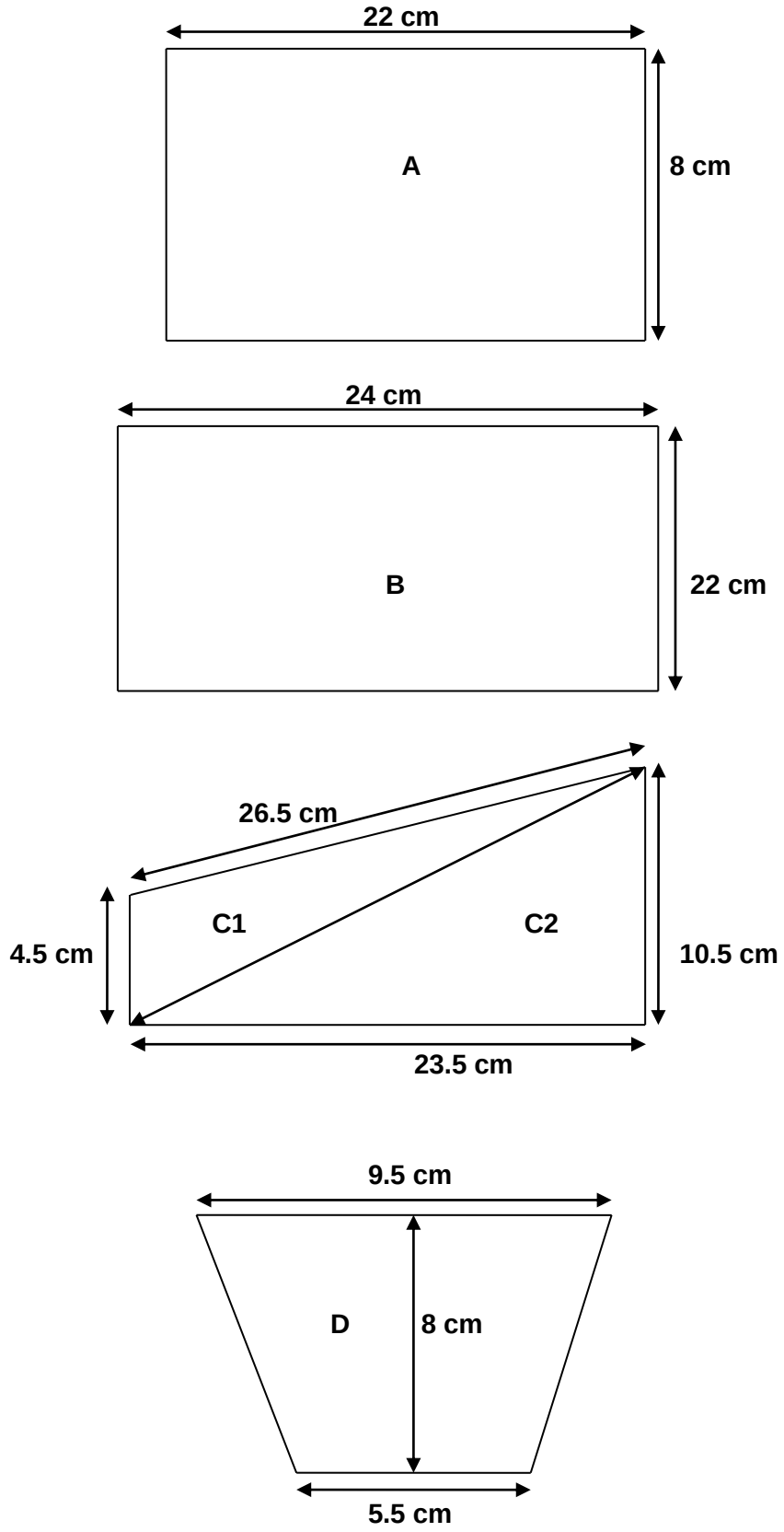
Roller:




A = 2πrh (136 no's)
= 2 x 3.14 x 0.75 x 22
= 103.62

= 103.62 x 136
= 14092.32

Exit Chute:




A = l x b
= 22 x 8

= 176

B = l x b
= 24 x 22
= 528

C = C1 + C2

C1 = 1/2absin(c)
= 0.5 x 26.5 x 4.5 x sin (4.5/26.5)
= 10.08

C2 = 1/2absin(c)
= 0.5 x 23.5 x 10.5 x sin (10.5/23.5)
= 53.31

C = C1 + C2 (2 no's)
= 10.08 + 53.31
= 63.39
= 63.39 x 2
= 126.78

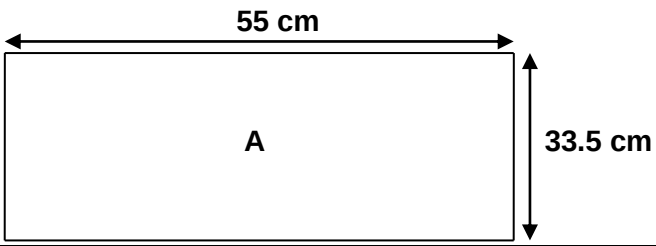
D = ½(a+b) h (2 no's)
= 0.5 x (9.5+5.5) x 8
= 60
= 60 x 2
= 120

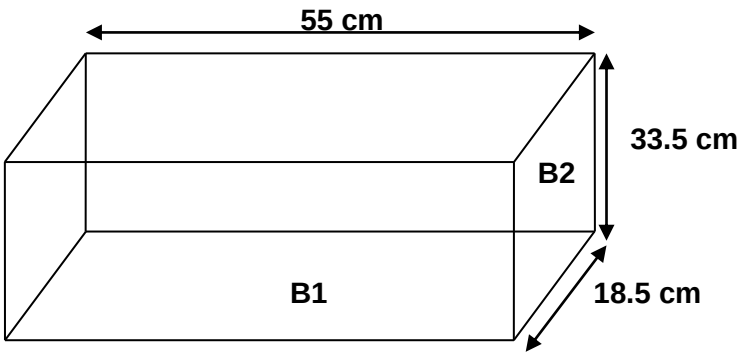
A + B + C + D
= 176 + 528 + 126.78 + 120
= 950.78

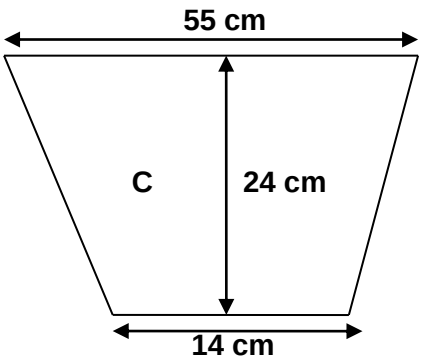
Tablet/ Filled Capsule Sorter = (A+B+C+D+E+F) + (A+B+C) + A + (A+B+C+D)
= 8776.23 + 1589.26 + 14092.32 + 950.78
= 25408.59 $cm^2$

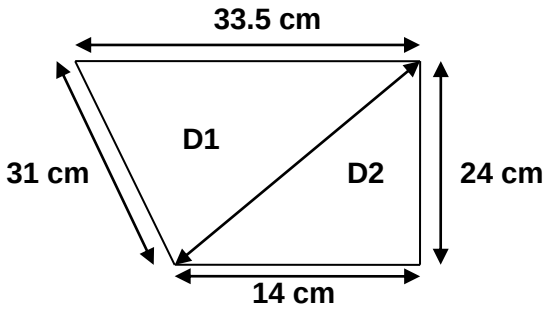
## BLISTER QUICK SERVO

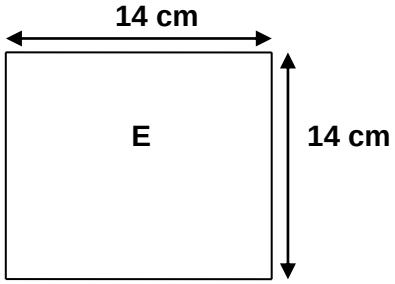
Hopper:

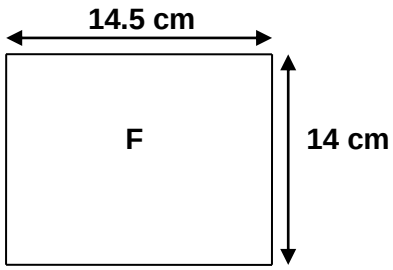



55 cm
33.5 cm
B2
B1
18.5 cm


55 cm
C
24 cm
14 cm


33.5 cm
D1
31 cm
D2
24 cm
14 cm


14 cm
E
14 cm




A = l x b
= 55 x 33.5
= 1842.5

B = B1 + B2

B1 = l x b (2 no's)
= 55 x 33.5
= 1842.5
= 1842.5 x 2
= 3685

B2 = l x b (2 no's)
= 18.5 x 33.5
= 619.75
= 619.75 x 2
= 1239.5

B = B1 + B2
= 3685 + 1239.5
= 4924.5

C = ½(a+b) h
= 0.5 x (55+14) x 24
= 828

D = D1 + D2

D1 = 1/2absin(c)
= 0.5 x 33.5 x 31 x sin (31/33.5)
= 414.8

D2 = 1/2absin(c)

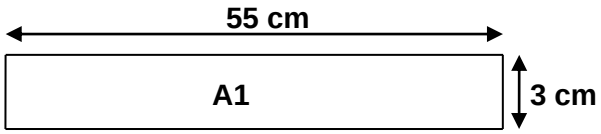
= 0.5 x 24 x 14 x sin (14/24)
= 92.54

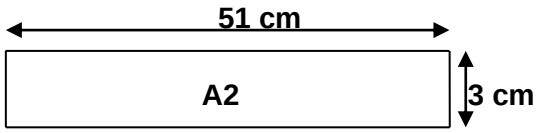
D = D1 + D2
= 414.8 + 92.54
= 507.34

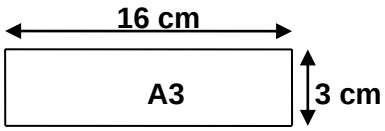
$E = l^2$
= 14 x 14
= 196
F = l x b
= 14.5 x 14
= 203

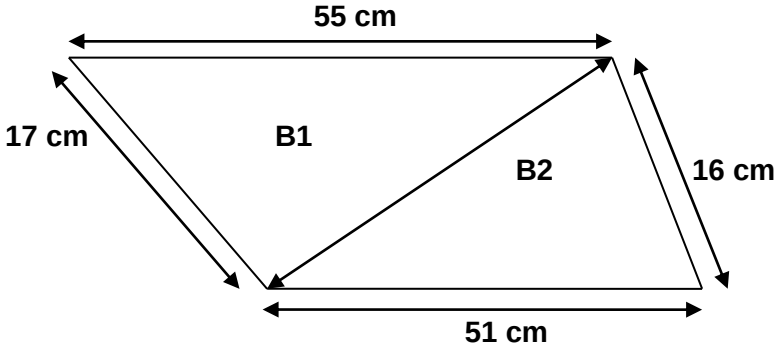
A + B + C + D + E + F
= 1842.5 + 4924.5 + 828 + 507.34 + 196 + 203
= 8501.34

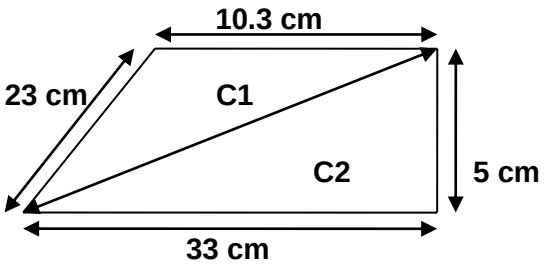
Linear Vibratory Tray:

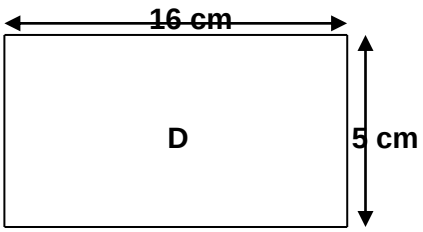


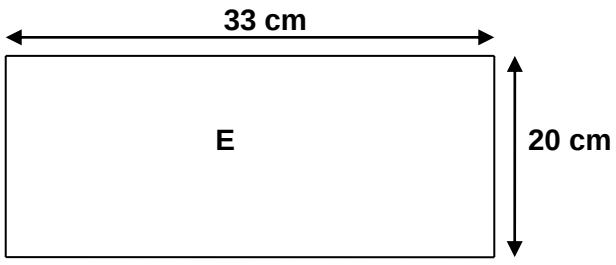



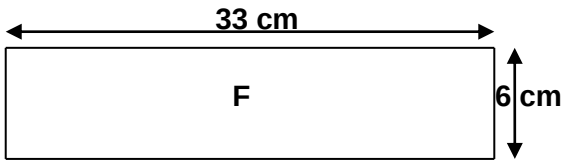






A = A1 + A2 + A3

A1 = l x b
= 55 x 3
= 165

A2 = l x b
= 51 x 3
= 153

A3 = l x b
= 16 x 3
= 48

A = A1 + A2 + A3
= 165 + 153 + 48
= 366

B = B1 + B2

B1 = 1/2absin(c)
= 0.5 x 55 x 17 x sin (17/55)
= 142.21

B2 = 1/2absin(c)
= 0.5 x 51 x 16 x sin (16/51)
= 125.91

B = B1 + B2
= 142.21 + 125.91
= 268.21

C = C1 + C2

C1 = 1/2absin(c)
= 0.5 x 23 x 10.3 x sin (10.3/23)
= 51.29

C2 = 1/2absin(c)
= 0.5 x 33 x 5 x sin (5/33)
= 12.45

C = C1 + C2
= 51.29 + 12.45
= 63.74

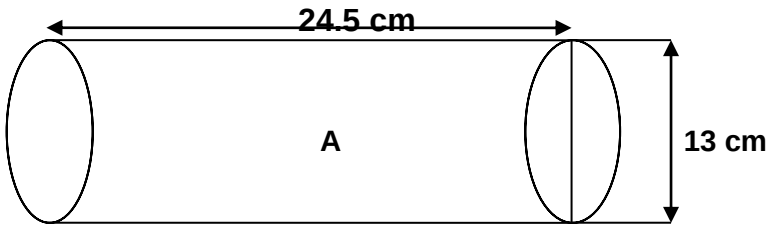
D = l x b
= 16 x 5
= 80

E = l x b
= 33 x 20
= 660

F = l x b
= 33 x 6
= 198

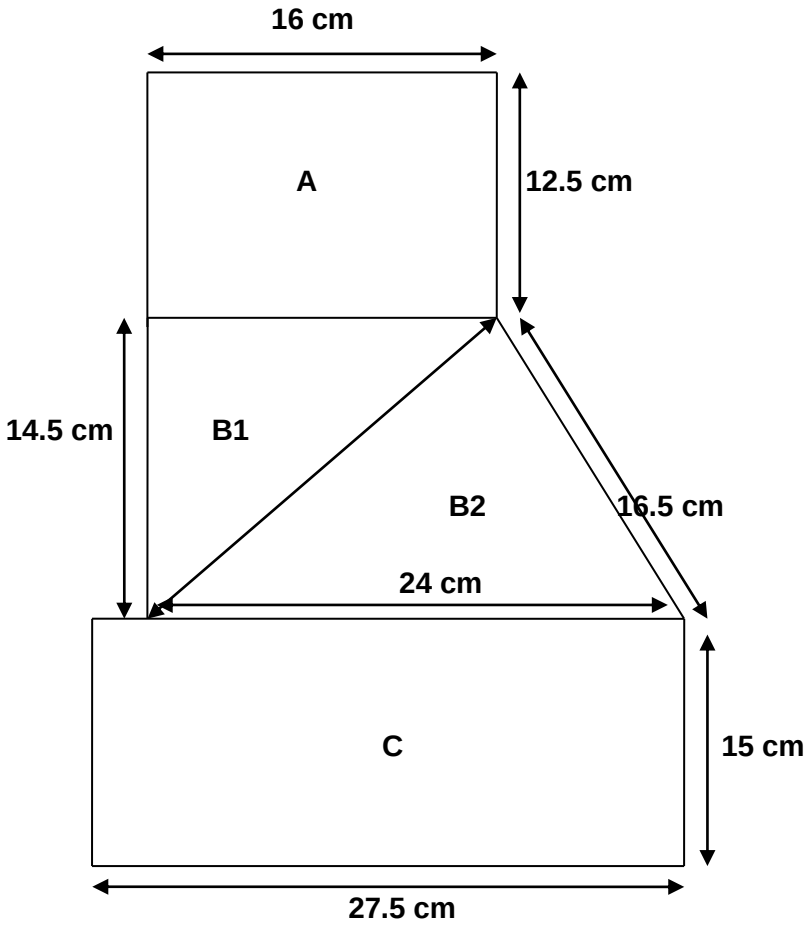
A + B + C + D + E + F
= 366 + 268.21 + 63.74 + 80 + 660 + 198
= 1635.95

Rotatory Feeder:




A = 2πrh
= 2 x 3.14 x 6.5 x 24.5
= 1000.09

Channel Feeder:



A = l x b
= 16 x 12.5
= 200

B = B1 + B2

B1 = 1/2absin(c)
= 0.5 x 14.5 x 16 x sin (14.5/16)
= 91.31

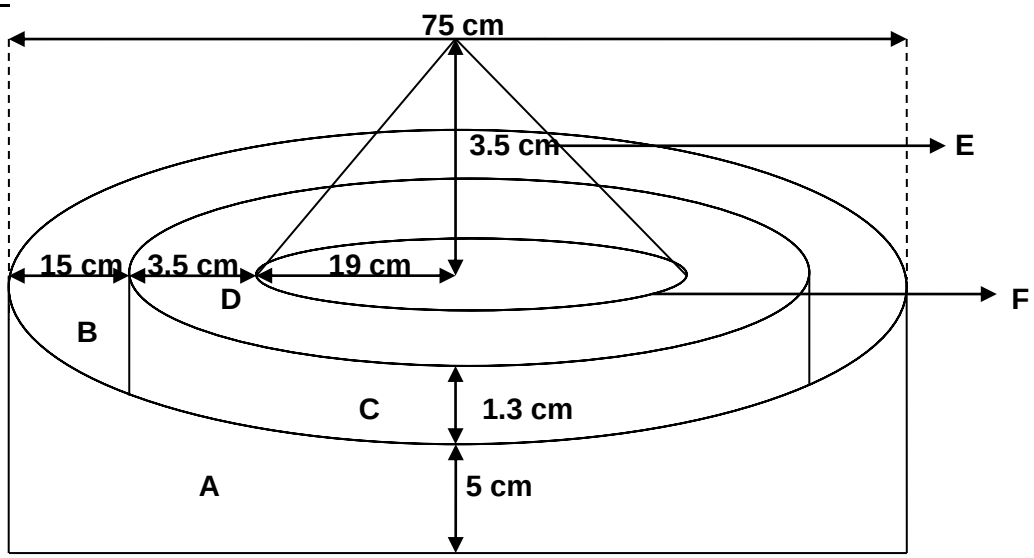
B2 = 1/2absin(c)
= 0.5 x 24 x 16.5 x sin (16.5/24)
= 125.65

B = B1 + B2
= 91.31 + 125.65
= 216.96

C = l x b
= 27.5 x 15
= 412.5

A + B + C
= 200 + 216.96 + 412.5
= 829.46

Rotatory Vibrator:




A = 2πrh
= 2 x 3.14 x 37.5 x 5

= 1177.5

B = $\pi r^2$
= 3.14 x $37.5^2$
= 4415.63

C = 2πrh
= 2 x 3.14 x 22.5 x 1.3
= 183.69

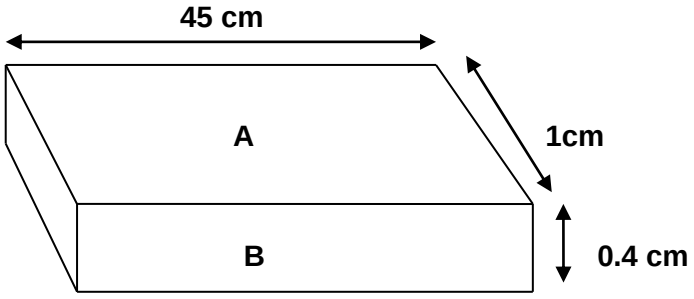
D = $\pi r^2$
= 3.14 x $22.5^2$
= 1589.63

E = π x r x $(r^2+h^2)^{1/2}$
= 3.14 x 19 x $(19^2+3.5^2)^{1/2}$
= 1152.61

F = $\pi r^2$
= 3.14 x $19^2$
= 1133.54

A+ (B-D) +C+ (D-F) +E
= 1177.5 + (4415.63-1589.63) + 183.69 + (1589.63-1133.54) + 1133.54
= 5776.82

Rectangular Tube:




A = l x b (2 no's)
= 45 x 1
= 45
= 45 x 2
= 90

B = l x b (2 no's)
= 45 x 0.4
= 18
= 18 x 2

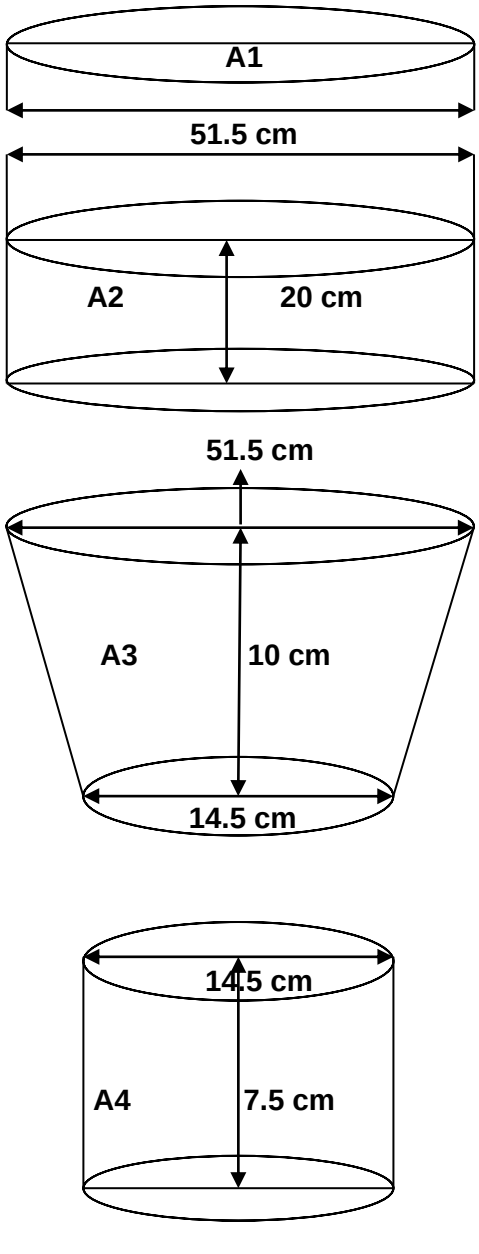
= 36

A + B
= 90 + 36
= 126

Blister Quick Servo = (A+B+C+D+E+F) + (A+B+C+D+E+F) + A + (A+B+C) + (A+ (B-D) +C+ (D-F) +E) + (A+B)
= 8501.34 + 1635.95 + 1000.09 + 829.46 + 5776.82 + 126
= 17869.66 $cm^2$

## BLISTER PACK MACHINE (230-XT)

Hopper:



A = A1 + A2 + A3 + A4

A1 = $\pi r^2$
= 3.14 x $25.75^2$
= 2082.02

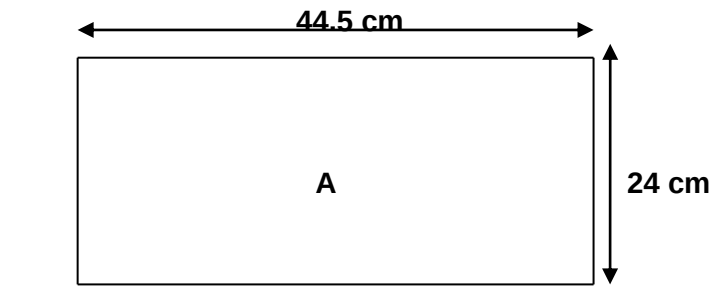
A2 = 2πrh
= 2 x 3.14 x 25.75 x 20
= 3234.2

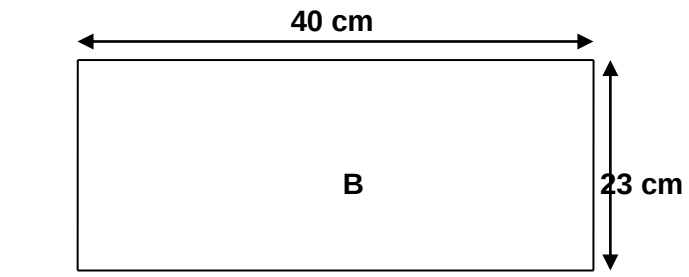
A3 = π x (r1+r2) x $(h^2 + (r1-r2)^2)^{1/2}$
= 3.14 x (25.75 + 7.25) x $(10^2 + (25.75-7.25)^2)^{1/2}$
= 2179.10

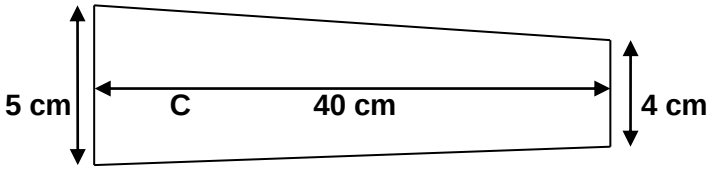
A4 = 2πrh
= 2 x 3.14 x 7.25 x 7.5
= 341.48

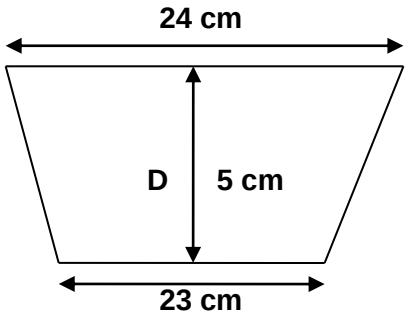
A = A1 + A2 + A3 + A4
= 2082.02 + 3234.2 + 2179.10 + 341.48
= 7836.8

Vibratory Tray:






A = l x b
= 44.5 x 24
= 1068

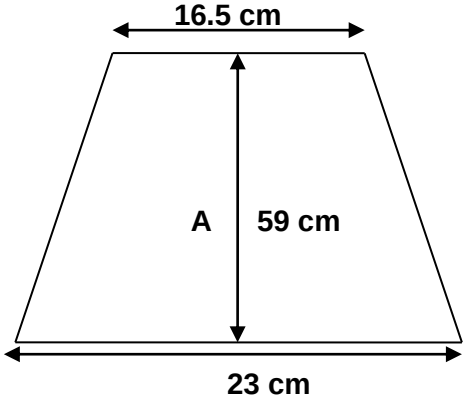
B = l x b
= 40 x 23
= 920

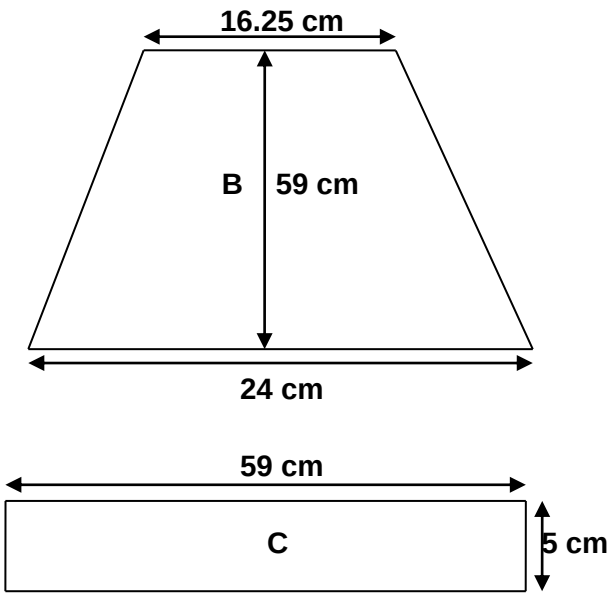
C = ½(a+b) h (2 no's)
= 0.5 x (4+5) x 40
= 180
= 180 x 2
= 360

D = ½(a+b) h
= 0.5 x (24+23) x 5
= 117.5

A + B + C + D
=1068 + 920 + 360 + 117.5
= 2465.5

Chute:





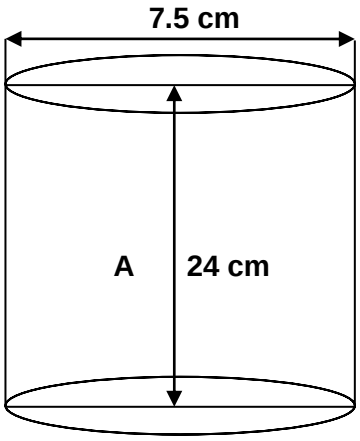

A = ½(a+b) h
= 0.5 x (16.5+23) x 59
= 1165.25

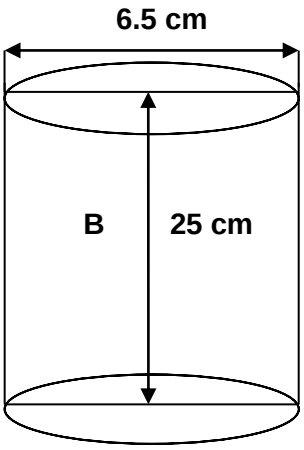
B = ½(a+b) h
= 0.5 x (16.25+24) x 59
= 1187.38

C = l x b (2 no's)
= 59 x 5
= 295
= 295 x 2
= 590

A + B + C
= 1165.25 + 1187.38 + 590
= 2942.63

Universal Brush Feeder:



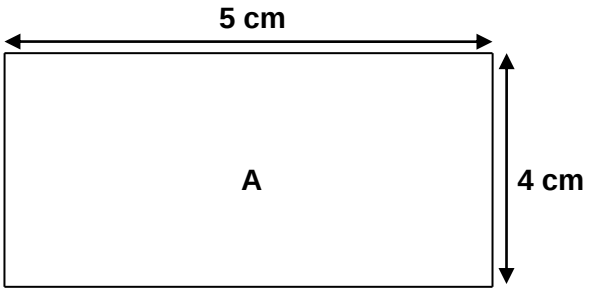



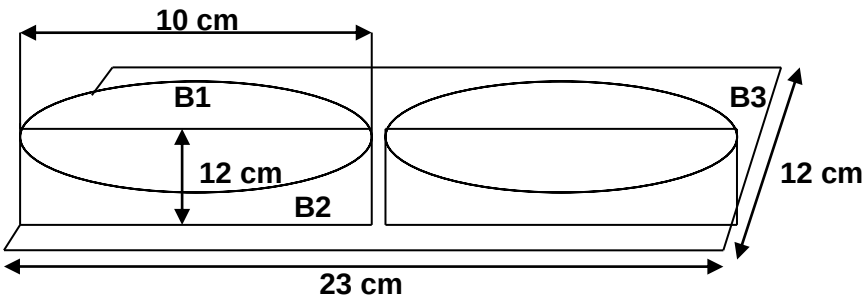

A = 2πrh (3 no's)
= 2 x 3.14 x 3.75 x 24
= 565.2
= 565.2 x 3
= 1695

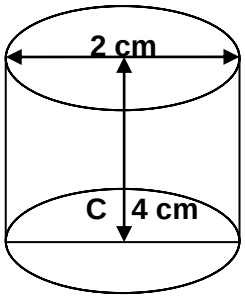
B = 2πrh (2 no's)
= 2 x 3.14 x 3.25 x 25
= 510.25
= 510.25 x 2
= 1020.5

A + B
= 1695 + 1020.5
= 2715.5

Universal Paddle Feeder:




A = l x b (10 no's)
= 5 x 4
= 20
= 20 X 10
= 200

B = B1 + B2 + B3

B1 = 2πrh (2 no's)
= 2 x 3.14 x 5 x 12
= 376.8
= 376.8 x 2
= 753.6

B2 = $\pi r^2$ (2 no's)
= 3.14 x $5^2$
= 78.5
= 78.5 x 2
= 157

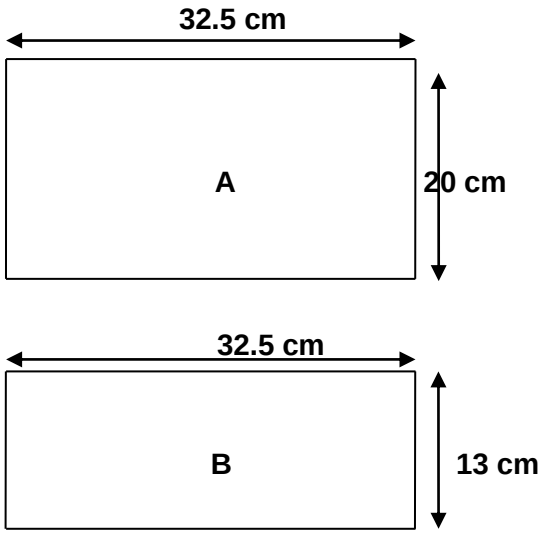
B3 = l x b
= 3 x 2
= 6

B = B1 + B2 + B3
= 753.6 + 157 + 6
= 916.6

C = 2πrh (2 no's)
= 2 x 3.14 x 1 x 4
= 25.12
= 25.12 x 2
= 50.24

A + B + C
= 200 + 916.6 + 50.24
= 1166.84

Feeder Cover:

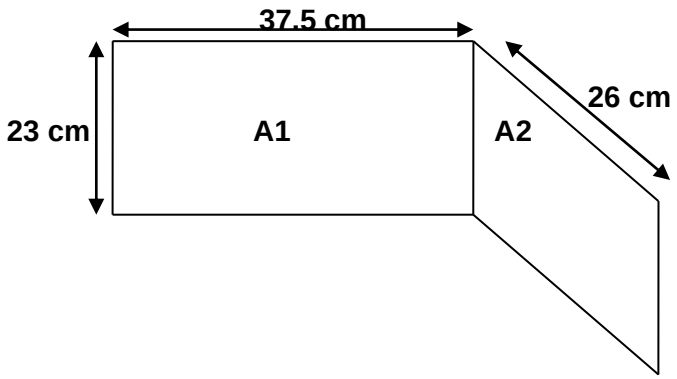


A = l x b
= 32.5 x 20
= 650

B = l x b (2 no's)
= 32.5 x 13
= 422.5
= 422.5 x 2
= 845

A + B
= 650 + 845
= 1495

Channel Feeder:




A = A1 + A2

A1 = l x b
= 37.5 x 23
= 862.5

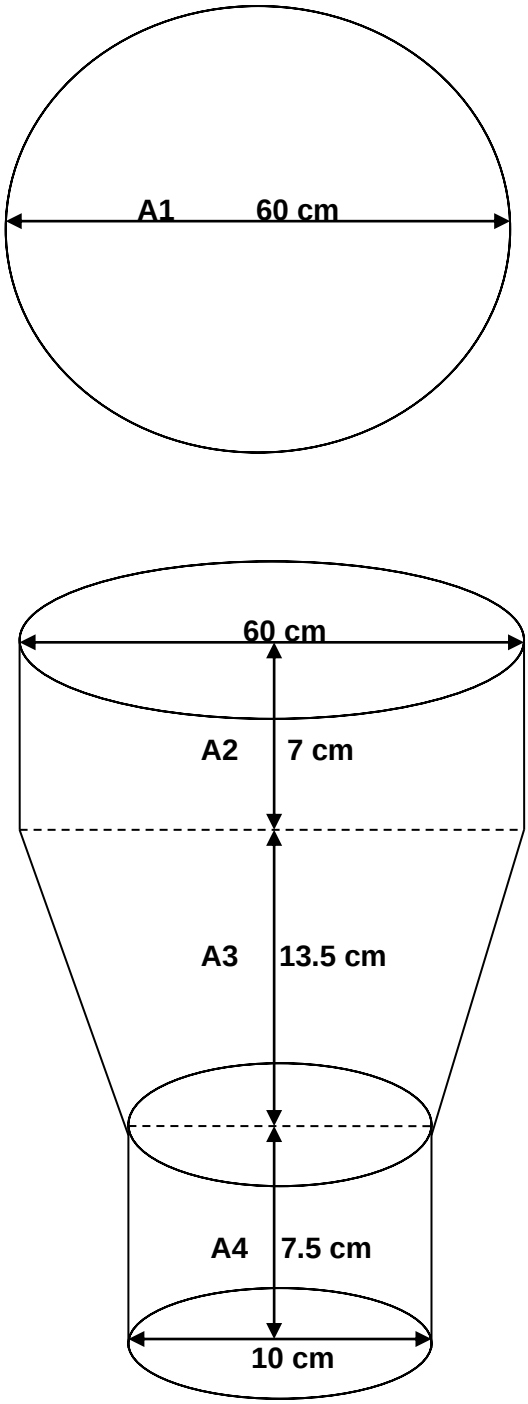
A2 = l x b
= 26 x 23
= 598

A = A1 + A2
= 862.5 + 598
= 1460.5

Blister Pack Machine (230-XT) = A + (A+B+C+D) + (A+B+C) + (A+B) + (A+B+C) + (A+B) + A
= 7836.8 + 2465.5 + 2942.63 + 2715.5 + 1066.84 + 1495 + 1460.5
= 20082.77 $cm^2$

# BLISTER PACK MACHINE (240-EX)

Hopper:



A = A1 + A2 + A3 + A4

A1 = $\pi r^2$
= 3.14 x $30^2$
= 2826

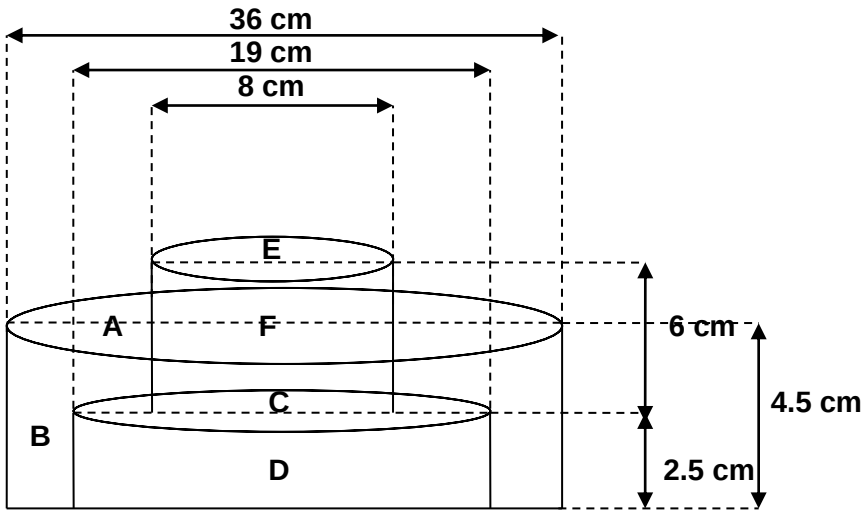
A2 = 2πrh
= 2 x 3.14 x 30 x 7
= 1318.8

A3 = π x (r1+r2) x $(h^2+ (r1-r2)^2)^{1/2}$
= 3.14 x (30+5) x $(13.5^2+ (30-5)^2)^{1/2}$
= 3122.50

A4 = 2πrh
= 2 x 3.14 x 5 x 7.5
= 235.5

A = A1 + A2 + A3 + A4
= 2826 + 1318.8 + 3122.50 + 235.5
= 7502.8

Rotatory Vibrator:




A = $\pi r^2$
= 3.14 x $18^2$
= 1017.36

B = 2πrh
= 2 x 3.14 x 18 x 4.5

= 508.68

$C = \pi r^2$
$= 3.14 \times 9.5^2$
$= 283.39$

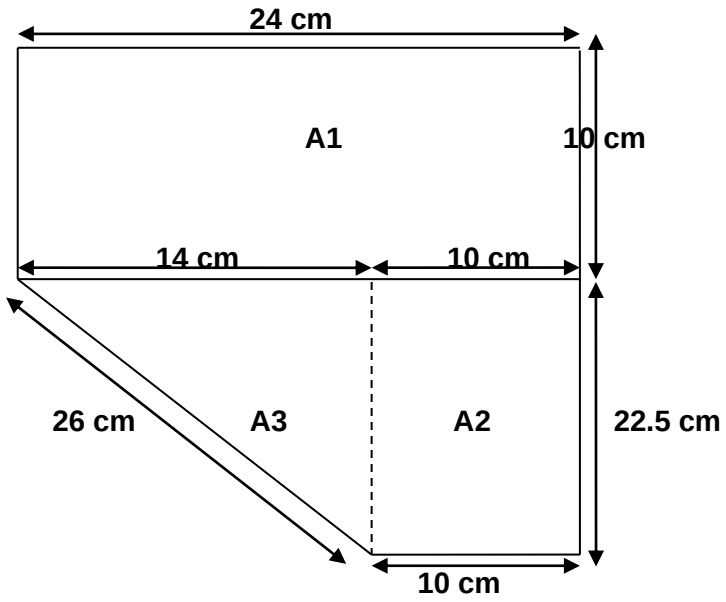
$D = 2\pi rh$
$= 2 \times 3.14 \times 9.5 \times 2.5$
$= 149.15$

$E = \pi r^2$
$= 3.14 \times 4^2$
$= 50.24$

$F = 2\pi rh$
$= 2 \times 3.14 \times 4 \times 6$
$= 150.72$

(A-C) + B + (C-E) + E + F
= (1017.36-283.39) + 508.68 + (283-50.24) + 50.24 + 150.22
= 1675.87

Channel Feeder:




A = A1 + A2 + A3

A1 = l x b
= 24 x 10
= 240

A2 = l x b
= 22.5 x 10
= 22

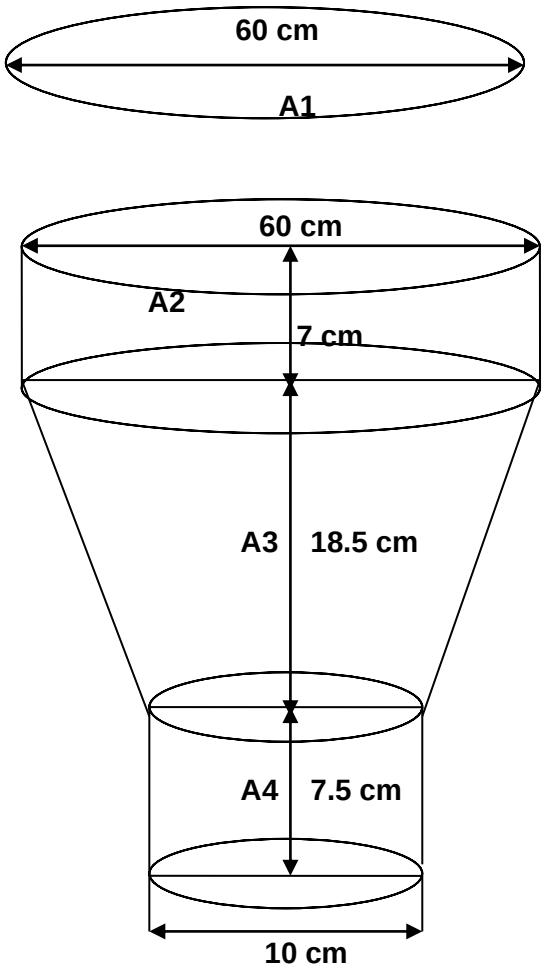
A3 = sqrt (s(s-a) (s-b) (s-c))
= sqrt (31.25 x (31.25-26) x (31.25-14) x (31.25-22.5))
= 157.36

A = A1 + A2 + A3
= 240 + 22 + 157.36
= 419.36

Blister pack Machine (240-EX) = A + ((A-C) + B + (C-E) + E + F)) + A
= 7502.8 + 1675.87 + 419.36
= 9598.03 cm²

## BLISTER PACK MACHINE (240-SS)

Hopper:



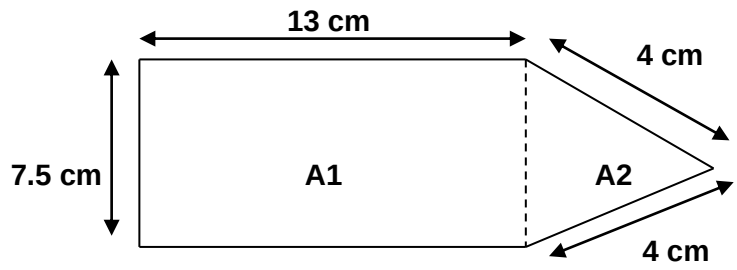

A = A1 + A2 + A3 + A4

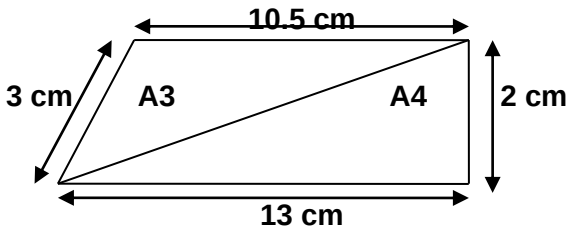
A1 = $\pi r^2$
= 3.14 x $30^2$
= 2826

A2 = 2πrh
= 2 x 3.14 x 30 x 7
= 1318.8

A3 = π x (r1+r2) x $(h^2 + (r1-r2)^2)^{1/2}$
= 3.14 x (30+5) x $(18.5^2 + (30-5)^2)^{1/2}$
= 3417.96

Chute:




A = A1 + A2 + A3 + A4

A1 = l x b
= 13 x 7.5
= 97.5

A2 = sqrt (s(s-a) (s-b) (s-c))
= sqrt (7.75 x (7.75-4) x (7.75-4) x (7.75-7.5))
= 5.22

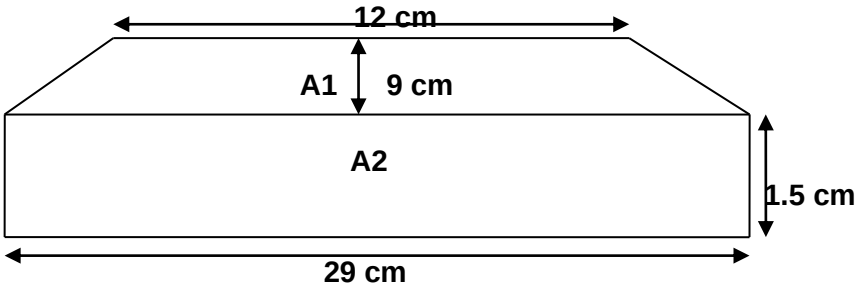
A3 = 1/2absin(c)

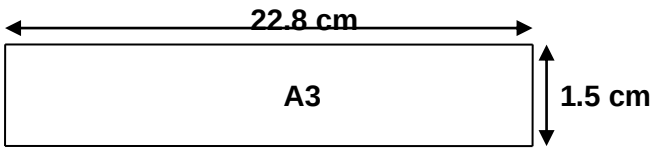
= 0.5 x 3 x 10.5 x sin (3/10.5)
= 4.44

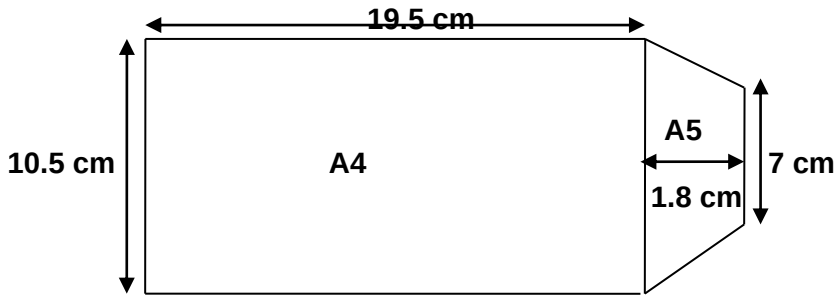
A4 = 1/2absin(c)
= 0.5 x 13 x 2 x sin (2/13)
= 2

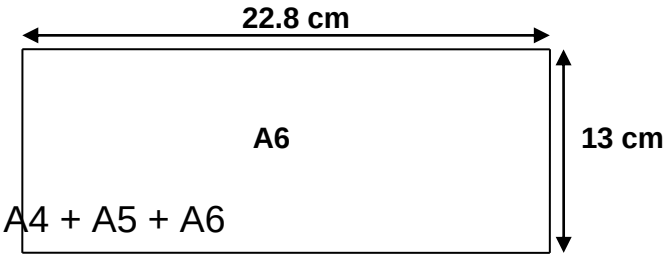
A = A1 + A2 + A3 + A4
= 97.5 + 5.22 + 4.44 + 2
= 109.16

Feeder Cover:




A = A1 + A2 + A3 + A4 + A5 + A6

A1 = ½(a+b) h
= 0.5(12+29) x 9

= 184.5

A2 = l x b
= 29 x 1.5
= 43.5

A3 = l x b
= 22.8 x 1.5
= 34.2

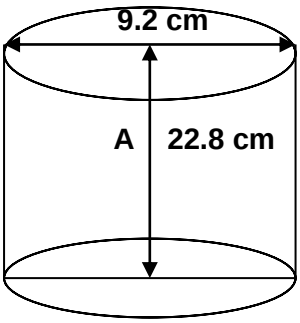
A4 = l x b
= 19.5 x 10.5
= 204.75

A5 = ½(a+b) h
= 0.5 x (7+10.5) x 1.8
= 15.75

A6 = l x b
= 22.8 x 13
= 68.4

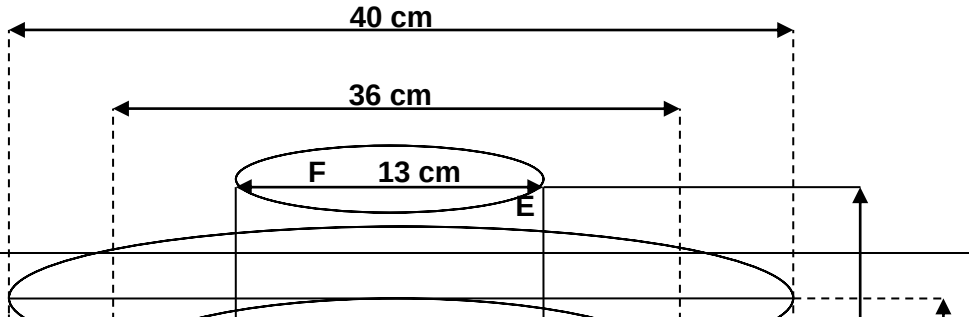
A = A1 + A2 + A3 + A4 + A5 + A6
= 184.5 + 43.5 + 34.2 + 204.75 + 15.75 + 68.4
= 551.1

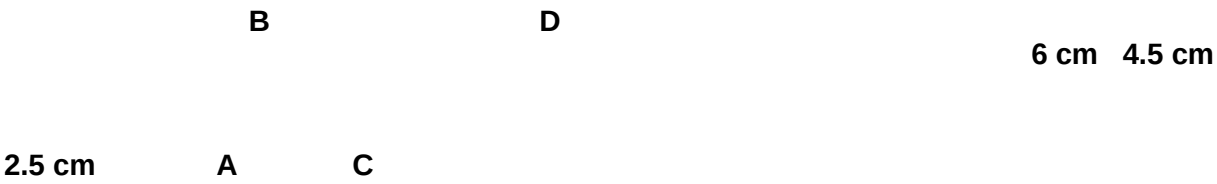
Barren:




A = 2πrh
= 2 x 3.14 x 4.6 x 22.8
= 658.65

Rotary Vibrator:






A = 2πrh
= 2 x 3.14 x 20 x 4.5
= 565.2

B = $\pi r^2$
= 3.14 x $20^2$
= 1256

C = 2πrh
= 2 x 3.14 x 18 x 2.5
= 282.6

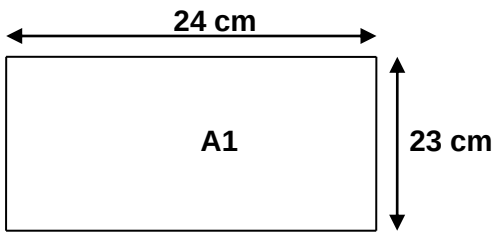
D = $\pi r^2$
= 3.14 x $18^2$
= 1017.36

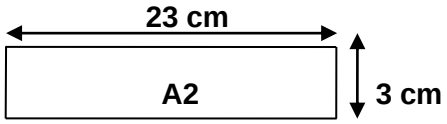
E = 2πrh
= 2 x 3.14 x 6.5 x 6
= 244.92

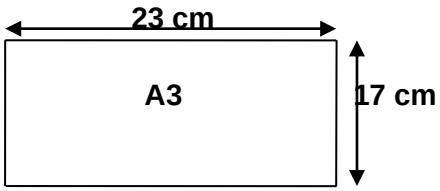
F = $\pi r^2$
= 3.14 x $6.5^2$
= 132.67

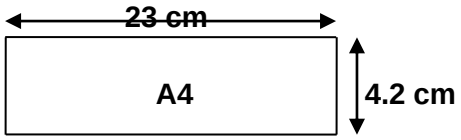
A + (B-D) + C + (D-F) + E + F
= 565.2 + (1256-1017.36) + 282.6 + (1017.36-132.67) + 244.92 + 132.67
= 2348.72

Channel Feeder:






A = A1 + A2 + A3 + A4

A1 = l x b
= 24 x 23
= 552

A2 = l x b
= 23 x 3
= 69

A3 = l x b
= 23 x 17
= 391

A4 = l x b
= 23 x 4.2
= 96.6

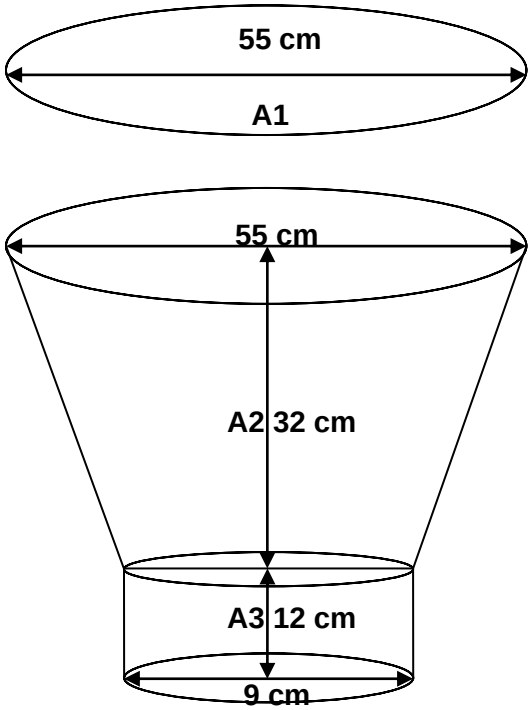
A = A1 + A2 + A3 + A4
= 552 + 69 + 391 + 96.6
= 1108.6

Blister Pack Machine (240-SS) = A + A + A + A + (A + (B-D) + C + (D-F) + E + F) + A
= 3417.96 + 109.16 + 551.1 + 658.65 + 2348.72 + 1108.6

= 8194.19 $cm^2$

## STRIP PACK MACHINE

Hopper:




A = A1 + A2 + A3

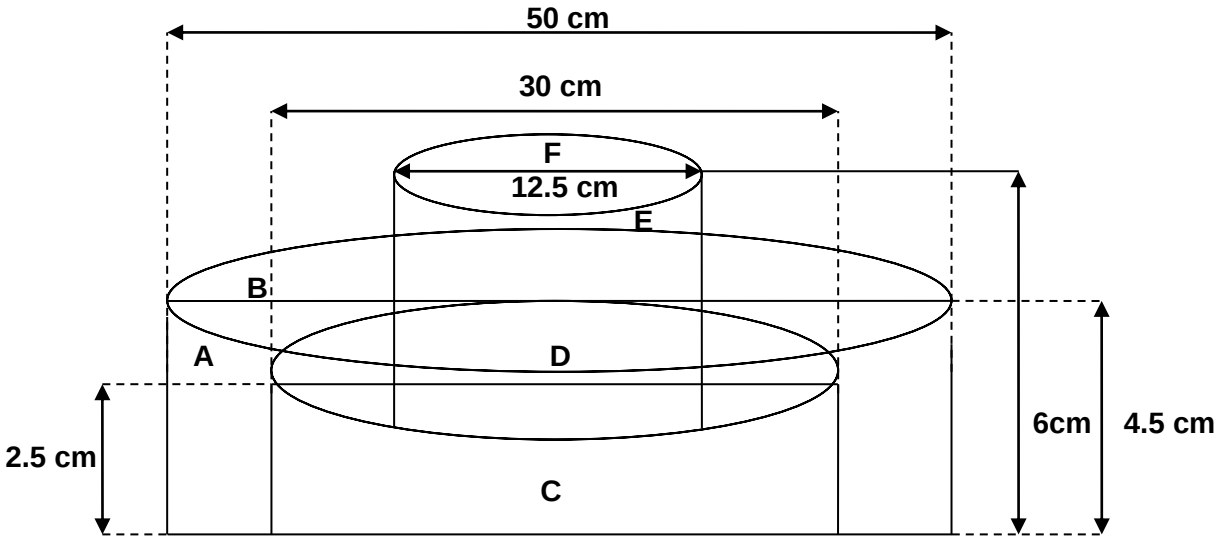
A1 = $\pi r^2$
= 3.14 x $27.5^2$
= 2374.63

A2 = $\pi$ x (r1+r2) x $(h^2 + (r1-r2)^2)^{1/2}$
= 3.14 x (27.5+4.5) x $(32^2 + (27.5-4.5)^2)^{1/2}$
= 3959.73

A3 = $2\pi rh$
= 2 x 3.14 x 4.5 x 12
= 339.12

A = A1 + A2 + A3
= 2374.63 + 3959.73 + 339.12
= 6673.48

Rotary Vibrator:




A = 2πrh
= 2 x 3.14 x 25 x 4.5
= 706.5

B = $\pi r^2$
= 3.14 x $25^2$
= 1962.5

C = 2πrh
= 2 x 3.14 x 15 x 2.5
= 235.5

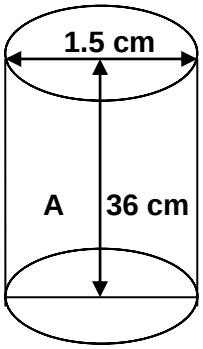
D = $\pi r^2$
= 3.14 x $15^2$
= 706.5

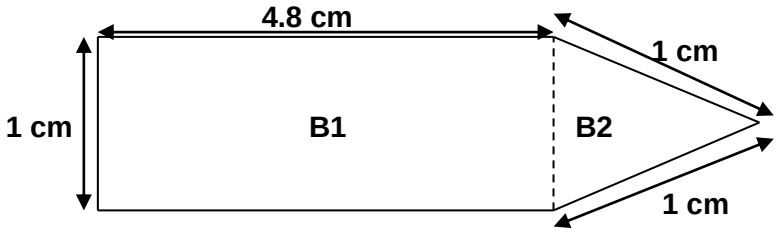
E = 2πrh
= 2 x 3.14 x 6.25 x 6
= 235.5

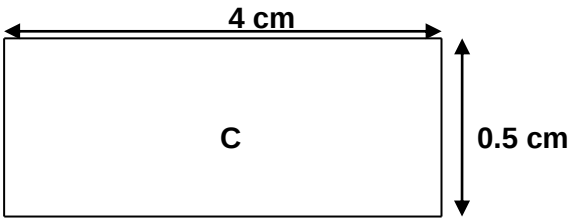
F = $\pi r^2$
= 3.14 x $6.25^2$
= 122.66

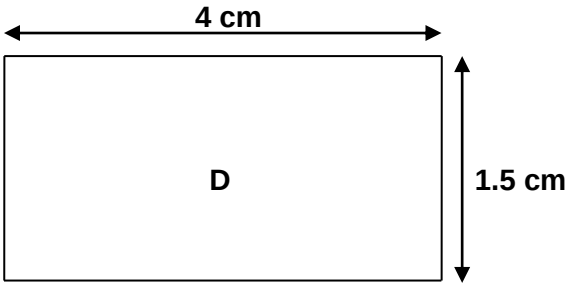
A + (B-D) + C + (D-F) + E + F
= 706.5 + (1962.5-706.5) + 235.5 + (706.5-122.66) + 235.5 + 122.66
= 3140

Feeder:




A = 2πrh (6 no's)
= 2 x 3.14 x 0.75 x 36
= 169.56
= 169.56 x 6
= 1017.36

B = B1 + B2

B1 = l x b
= 4.8 x 1
= 4.8

B2 = sqrt (s(s-a) (s-b) (s-c))
= sqrt (1.5 x (1.5-1) x (1.5-1) x (1.5-1))

= 0.43

B = B1 + B2 (12 no's)
= (4.8 + 0.43) x 12
= 62.76

C = l x b (12 no's)
= 4 x 0.5
= 2
= 2 x 12
= 24

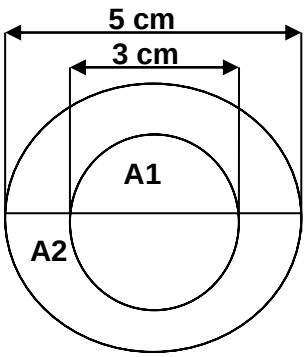
D = l x b (6 no's)
= 4 x 1.5
= 6
= 6 x 6
= 36

A + B + C + D
= 1017.36 + 62.76 + 24 + 36
= 1140.12

Strip Pack Machine = A + (A + (B-D) + C + (D-F) + E + F) + (A + B + C + D)
= 6673.48 + 3140 + 1140.12
= 10953.6 $cm^2$

## STRIP DEFOILING MACHINE

Blade:



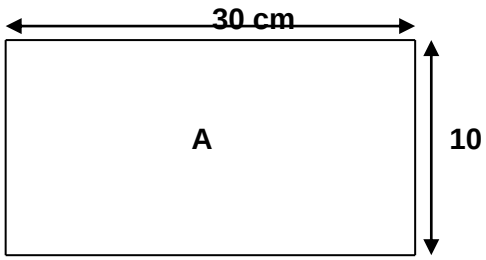

A = A1- A2

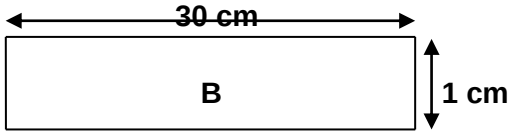
A1 = $\pi r^2$
= 3.14 x $2.5^2$
= 19.63

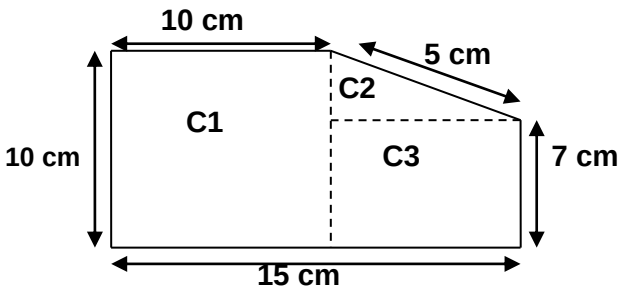
A2 = $\pi r^2$
= 3.14 x $1.5^2$
= 7.1

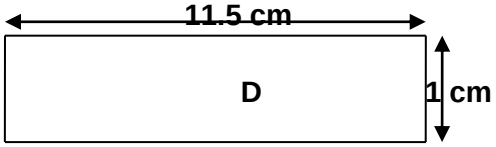
A = A1-A2 (4 no's)
= 19.63 - 7.1
= 12.53
= 12.53 x 4
= 50.12

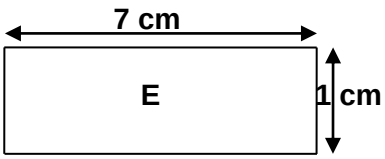
Tray:

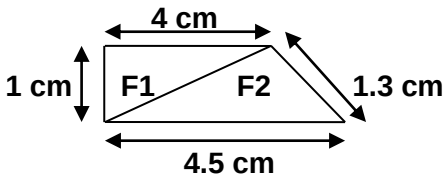





A = l x b
= 30 x 10
= 300

B = l x b
= 30 x 1
= 30

C = C1 + C2 + C3

C1 = $l^2$
= 10 x 10
= 100

C2 = sqrt (s(s-a) (s-b) (s-c))
= sqrt (6.5 x (6.5-5) x (6.5-5) x (6.5-3))
= 51.19

C3 = l x b
= 5 x 7
= 35

C = C1 + C2 + C3
= 100 + 51.19 + 35
= 186.19

D = l x b
= 11.5 x 1
= 11.5

E = l x b
= 7 x 1
= 7

F = F1 + F2

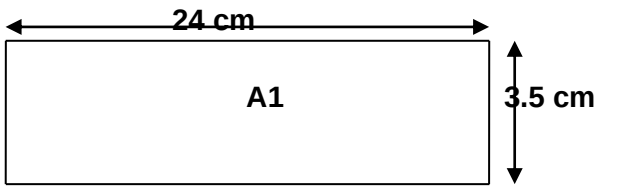
F1 = 1/2absin(c)
= 0.5 x 1 x 4 x sin (1/4)
= 0.5

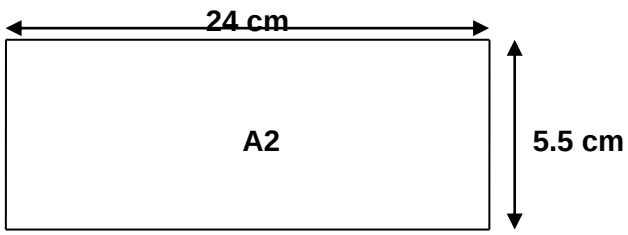
F2 = 1/2absin(c)
= 0.5 x 1.3 x 4.5 x sin (1.3/4.5)
= 0.83

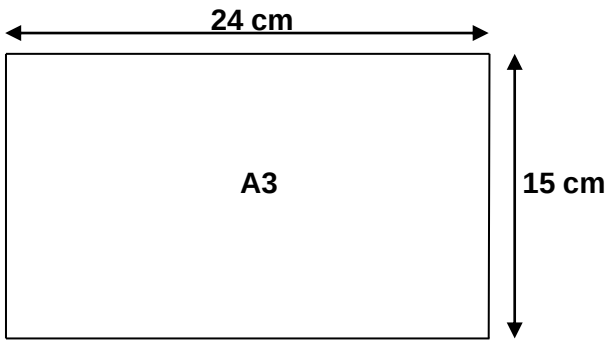
F = F1 + F2
= 0.5+0.83
= 1.33

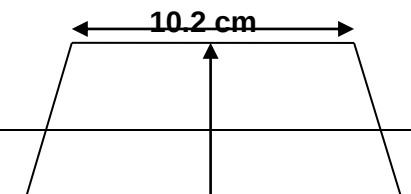
A + B + C + D + E + F
= 300 + 30 + 186.19 + 11.5 + 7 + 1.33
= 536.02

Perforated Tray:



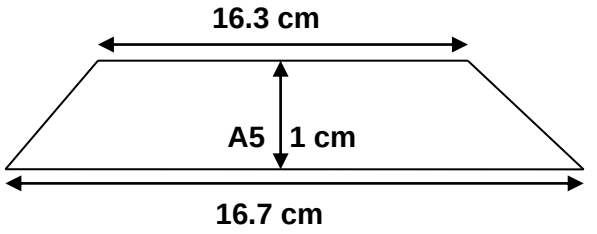



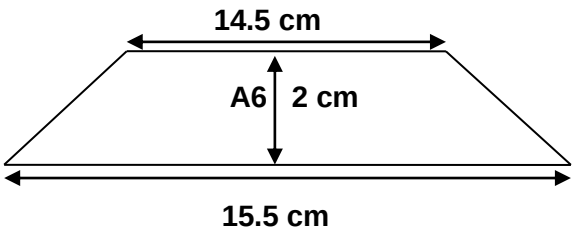



**A4** **17 cm**

**24 cm**




A = A1 + A2 + A3 + A4 + A5 + A6

A1 = l x b
= 24 x 3.5
= 84

A2 = l x b
= 24 x 5.5
= 132

A3 = l x b
= 24 x 15
= 360

A4 = ½(a+b) h
= 0.5 x (10.2+24) x 17
= 290.7

A5 = ½(a+b) h (2 no,s)
= 0.5 x (16.3+16.7) x 1
= 16.5
= 16.5 x 2
= 33

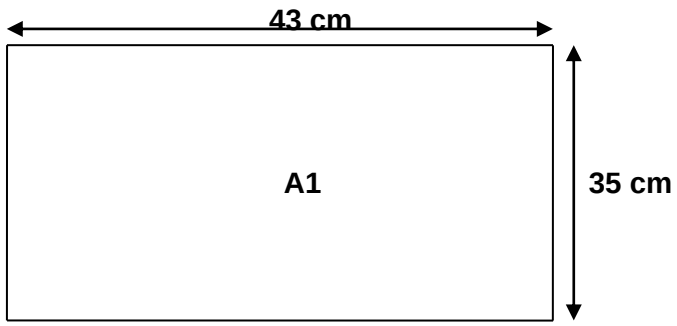
A6 = ½(a+b) h (2 no's)
= 0.5 x (14.5+15.5) x 2
= 30
= 30 x 2
= 60

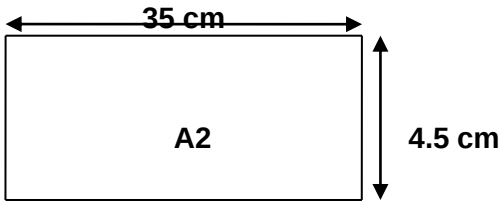
A = A1 + A2 + A3 + A4 + A5 + A6
= 84 + 132 + 360 + 290.7 + 33 + 60
= 959.7

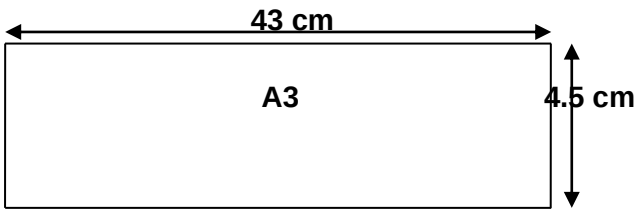
Strip Defoiling Machine = A + (A+B+C+D+E+F) + A
= 50.12 + 536.02 + 959.7
= 1545.84 $cm^2$

## DEBLISTER MACHINE

Tablets Collecting Tray:




A = A1 + A2 + A3

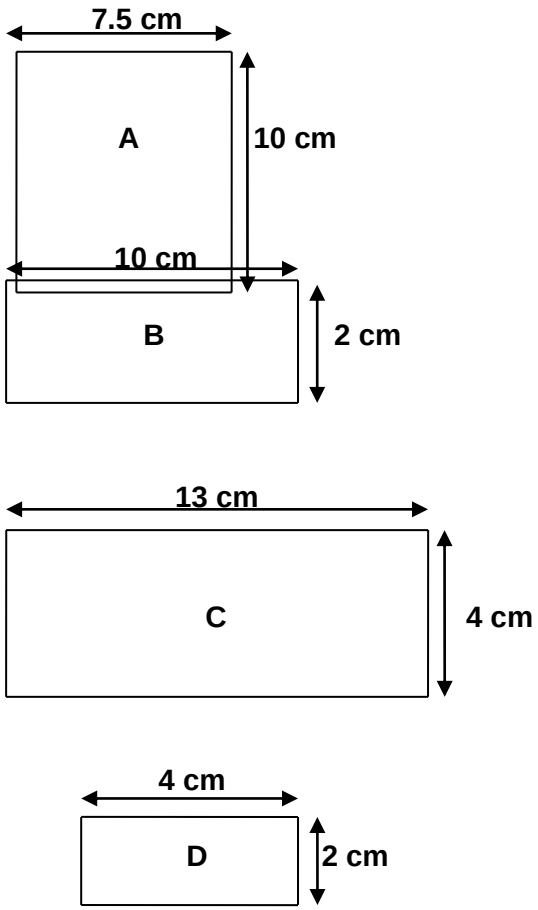
A1 = l x b (2 no's)
= 43 x 35
= 1505
= 1505 x 2
= 3010

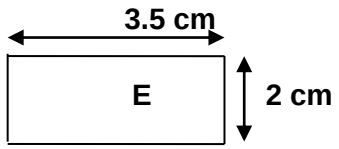
A2 = l x b (2 no's)
= 35 x 4.5
= 157.5
= 157.5 x 2
= 315

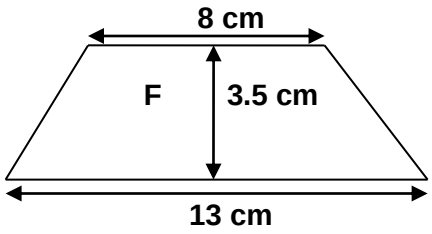
A3 = l x b (2 no's)
= 43 x 4.5
= 193.5
= 193.5 x 2
= 387

A = A1 + A2 + A3
= 3010 + 315 + 387
= 3712

Channel Tray:






A = l x b
= 10 x 7.5
= 75

B = l x b (2 no's)
= 10 x 2
= 20
= 20 x 2
= 40

C = l x b
= 13 x 4
= 52

D = l x b
= 4 x 2
= 8

E = l x b (2 no's)
= 3.5 x 2
= 7

F = ½(a+b) h
= 0.5 x (8+13) x 3.5
= 58.8

A + B + C + D + E + F
= 75 + 40 + 52 + 8 + 7 + 58.8
= 240.8

Deblister Machine = A + (A+B+C+D+E+F)
= 3712 + 240.8
= 3952.8 $cm^2$