

1 About Cropping Rooms for 200 TPA

a. No and size of rooms

No. of rooms required

8

When we have considered:

Shelves

5

Biological efficiency

20 per cent

Crops per room per year

6

Size of room:

Width of room

5.85 m or

19.20 ft

Length

17.56 m or

57.60 ft

Height

3.81 m or

12.50 ft

Area for cropping rooms+corridor+walls

1026.01 m² or

11038.25 sq ft

b.

Size of outlet for air at base of room

No of outlets

2

Area of each outlet (OPG)

0.30 m²

Width (cm) of each outlet

50 cm

Length (cm) of each outlet

60 cm

Side (if square)

55 cm

The actual size may vary as per type and size of filter

c. Capacity of each room

Compost/room (recommended)

20.0 ton

Compost (normal)

23.0 ton

Compost (max.)- less recommended

25.5 ton

(Capacity at approximate air bed ratio of 6:1, 5.5:1 and 5:1)

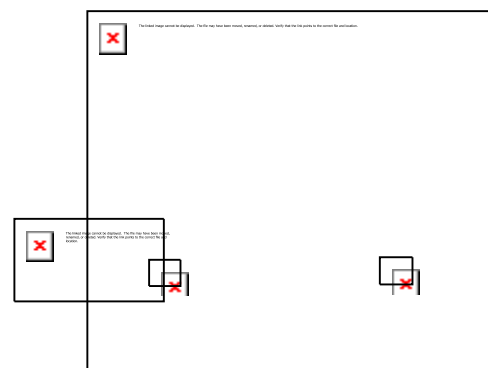
d. Specifications of air circulation duct in cropping room

No of main duct

1

No of sub-ducts

2 no.



No.of holes per sub duct	32	no.
CMH of AHU fan	4500	m3/h
Pressure of fan	5 to 7	cm WG
Dia of each hole to achieve 8m/s (valid for room height of 3.8 m)	55.8	mm
Dia of main duct (for 4m/s)	63.1	cm
dia of sub duct	44.6	cm
Width of collapsed main duct	99.1	cm
width of collapsed sub duct	70.0	cm
Side, if main duct is square	55.9	cm
Side, if sub duct is square	39.5	cm

2 About Cold Room

a. Size of Cold Room

No of cold rooms required	1
Size - 10x10x10ft of each room	28.3 m3
Approx max. Capacity of each room	2.0 Ton

3 About air conditioning (TR)

Compost/room	23.0 ton
Total no. of rooms	8
Compost per crop cycle	200 ton
Rounded TR (normal)	60 TR
TR (extreme hot conditions)	80 TR

These are broad estimates. Actual calculation may require consideration of many factors like location, maximum temp, type of insulation used, load variation as per season, etc.

In small units of four rooms or so, self contained AHUs may be put. Here TR may be half of the compost capacity of a room in the form of one or two units (e.g. two units of 5 TR each for a room accomodating 20 ton compost).

4 About Tunnels & Spawning Area

a. No and size of tunnels

	Normal			Max.		
No of tunnels required	2			2		
width of tunnel	2.83	m	to	3.00	m	
Length	10.19	m	to	10.8	m	
or						
width of tunnel	9.3	ft	to	9.8	ft	
Length	33.4	ft	to	35.4	ft	

b. Capacity of Tunnel

Min compost input with 1.7 m filling	24.3 ton
Min compost output	18.0 ton
Normal compost input with 1.9 to2.1 m	29.2 ton
Normal compost output	21.0 ton
Max compost input (2.2 m filling)	32.1 ton
Max compost output	24.0 ton

c. Specifications of Tunnel

Min. Depth of plenum in front	0.52 m =	1.71 ft
Slope	0.20 m =	0.64 ft
Min. Depth of plenum in back	0.32 m =	1.06 ft
CMH of fan	5800 CMH to	6500 CMH
Pressure of fan	10-12 cm WG	
Type of fan	Backward cuved or backward inclined	

Min area of duct	0.181	m2	=	1.94	sqft
Normal area of duct	0.241	m2	=	2.59	sqft
Min. side of square duct	43	cm	=	16.7	inch
Normal side of square duct	50	cm	=	19.7	inch
Side of filter for fresh air	85	cm	=	33.5	inch
Approx area of filter	0.73	m2	=	7.9	sqft

**The actual size of filter will depend upon size and specifications of filter available in the market.
Size can be somewhat less or more than given here**

Prefer less compost in summer and normal during winter. Avoid max compost input. 800-900 kg compost per m2 gives least problems. Filling should be loose and uniform. Actual required CMH of fan may be less. Opt for VFD. During pasteurization temp in plenum may be 56C and on top layer around 60 C. During pasteurization, temp in plenum may be 45-46C and above 50-51 C. Fresh air should never be stopped completely.

Holes in tunnel floor

Many times, instead of gratings, vertical pipes are put in plenum floor. Many text books recommend 25 % free area. In practice while using pipes, it may not be possible to achieve this and 10-15% may be sufficient. Many growers are using only 5%. Given below are values using one inch pipe for 10% area.

Dia of each pipe in plenum floor	2.5	cm	=	1.0	inch
Distance between holes for 10% free area	7.0	cm	=	2.8	inch

d. Size of Spawning Area

One side of spawning area	8.15	m	to	8.64	m
Other side of spawning area	6.26	m	to	6.60	m
Area for spawning	51.03	m2	to	57.0	m2
or					
One side of spawning area	26.7	ft	to	28.3	ft
Other side of spawning area	20.5	ft	to	21.6	ft
Area for spawning	549.1	sqft	to	613.6	sqft

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About bunkers**a. No and size of bunkers**

No. of bunkers required	3		3
Length of bunker	11.1 m	to	12.1 m
Width of bunker	3.7 m	to	4.0 m
or			
Length of bunker	36.5 ft	to	39.6 ft
Width of bunker	12.2 ft	to	13.2 ft

b. Capacity of a bunker

Min compost that can be loaded	45 ton
Normal compost that can be loaded	56 ton

c. specifications of a bunker

No of pipes	9	to	10
No of spigots/pipe	28	to	31
Total spigots	252	to	310
Dia of pipe* (inner)	10 cm	to	10 cm
dia of main/Header pipe (inner)	33 cm	to	35 cm
CMH of Fan for normal fill	900 CMH	to	1100 CMH
CMH of Fan for max. fill	1400 CMH		1600 CMH
Pressure of fan	20 cm WG		20 WG
Hole of orifice in spighot (5-6 mm)	5.6 mm	to	5.6 mm

* Dia of pipe can be 10 or 16 cm (110 or 160 mm) depending upon the size of bunker and spigot.

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About Casing & Compost Yard**a. Area for casing chamber(s)**

14.5 m ²	to	16.2 m ²
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b. Compost Yard

Length	15.8 m	to	17.5 m
Breadth	10.4 m	to	11.4 m

Proposed area for compost yard	164	m ²	to	200	m ²
	or				
Length	52	ft	to	57	ft
Breadth	34	ft	to	37	ft
Proposed area for compost yard	1768	sq ft	to	2148	sq ft

Proposed area for compost yard

7 Raw Materials & spawn per annum

a. Raw materials required per annum

Wheat Straw	400	Ton
Chicken manure	280	Ton
Urea	7	Ton
Gypsum	20	Ton

There are many formula and raw materials like paddy straw, sugarcane bagasse/ leaves, mustard stalks, etc., various cakes, bran, fertilizers, etc. are also added in some combinations. Actual formula will vary as per availability and requirements.

b. Spawn required per annum

Spawn required per year @0.5%	5.0	ton
Spawn required per year @0.7%	7.0	ton
Spawn required per year @1.0%*	10.0	ton

***High rate of spawning adds to cost and may not be required**

8 Cropping Cycle

Total no of rooms	8
Total crops/year	6
Days of cropping	60
Room filling after every	7.2 days
total tunnels required (One per 6 rooms)	2
Tunnel cycle	14.4 days