ABOUT US

PILOTSMITH INDIA, the pioneers in equipment manufacturing for processing of Food, Herbs, Pharmaceutical & Packaging Machinery. PILOTSMITH has a well experienced design department and well equipped dedicated production unit for individual equipment. Our company has made lot of developments since 1985 by interacting and taking suggestions from thousands of customers all over the world. Different research institutions like IISR, CPCRI, CFTRI, CIFT, Kerala Agriculture University, etc. are our long time customers for their pilot production facilities and laboratories.

Size reduction equipment plays an important role in most of the processing units like spices, pulses, cereals, herbs, Pharmaceutical & chemical industries. As per the product requirement we are manufacturing different types of size reduction equipment. Major two models used in high volume grinding are **Hammer Mill** & **Impact Pulveriser**. Details of those machines and different modified models are described in this brochure.

Our Sister Concerns:

- Pilots India Kallettumkara - Technical consultants.
- Pacific Tanks Pvt. Ltd: Engaged in production of stainless steel tanks, pressure vessels and stainless steel equipments.
- Packlock Machines Pvt. Ltd: Engaged in manufacturing of packaging Machines.

Many of our equipments are certified by Govt. of India.
The patent office - Certificate of registration of design.

With Regards

Sheen Antony
Managing Director

INDEX

INTRODUCTION

The size reduction equipment plays an important role in most of the processing units like spices, pulses, cereals, herbs, pharmaceutical & chemical industries. Pilot Size reduction equipments are designed to achieve perfection in pulverising and to minimize power consumption, spillage, labour and maintenance. More than 30 years of experience lead us to achieve the best designs suitable for grinding almost all materials.

As per the product requirement we are manufacturing different types of size reduction equipments. Major two models used in high volume grinding are **Hammer Mill** & **Impact Pulveriser**. Hammer Mill is used mainly for grinding fibrous and oily raw material up to 450 microns, for non-fibrous & non-oily material up to 250 microns. In Hammer Mill particle sizes are determined by sieves of different hole sizes. Whereas Impact Pulveriser is used for grinding requirements less than 300 microns up to 50 microns. Here the particle sizes are determined by rotating classifier and airflow adjusting butterfly valve.

Hammer Mills are widely used in the following process industries:
Spices, Pulses, Cereals, Bakery, Herbal, Pharmaceutical & Chemical.

Impact Pulverisers are mainly used in the following process industries:
Pulses (Mainly black gram), Spices (Mainly turmeric), Dry fish, Herbs, Pharmaceutical, Clay, Paints, & Chemicals.

Our size reduction equipments are fabricated with different metals to meet the process requirement of the customer. Mainly SS-316, SS-304, CS, CI & Manganese Steel. Beaters are made of aberration resistant materials.

More details of above said machineries, its variants, accessories and areas of applications are mentioned in detail in the coming pages.

HAMMER MILL - GENERAL NOTE

Pilot Hammer Mills are recommended for bulk volume grinding of spices, pulses, herbs, raw materials for cattle and poultry feed, chemicals and ceramics.

This equipment is highly energy efficient, easy to operate, comparatively low price and low maintenance.

This machine can mount on anti-vibration mount and can place on normal concrete floor as the working is very smooth. The easily openable upper half of crushing chamber, easily interchangeable sieves and wide door on the cyclone tank helps for easy cleaning and raw material interchange.

The Hammer Mill is available with different material of contact suitable for individual raw materials. Generally Hammer Mills are made with CS, CI and alloy metals. Other optional materials of construction are Stainless Steel (AISI: 304, 316, 316L) as per requirement.

Oil lubricated bearing and dynamically balanced rotating parts ensure smooth working and long life of the equipment.

All bought out components like motor, gear box, bearings, belts, etc. used on Hammer Mill or its accessories are of reputed make.

Picture shown in the brochure are only for reference for their respective shapes. Optional accessories mentioned in the brochure will improve the overall performance and convenience of operation.

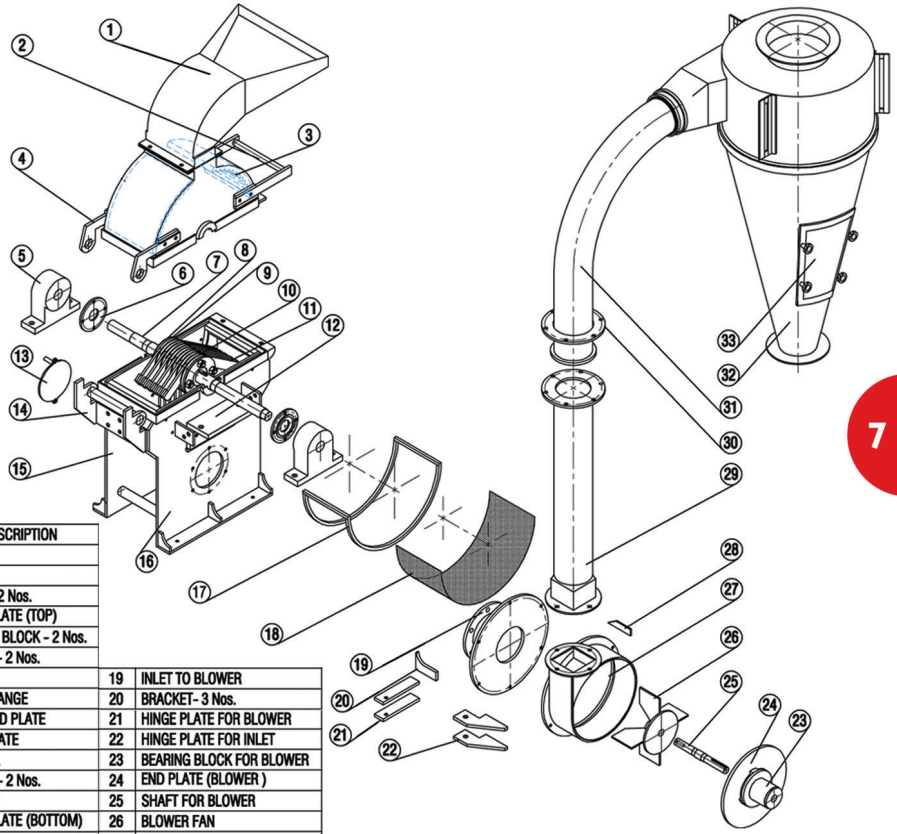
HAMMER MILL (SS)

HAMMER MILL - WORKING PRINCIPLE

The material to be ground enters into the crushing chamber from feed hopper by gravity or by an auto feeder (optional). A rotor having number of pivoted steel beaters radially and axially spaced which rotates at a high speed in a strong housing. The beaters inside the drum accelerate the material in a very high speed to the toothed liner placed at the upper half of the crushing chamber. The material is pulverised by repeated hammer impacts, collisions with the walls of the grinding chamber as well as particle on particle impact and shearing. The fine ground material is continuously sucked by a centrifugal blower through screen and is conveyed through a pipe into the cyclone dust collector for bagging. Meanwhile the coarse materials retains in the chamber for further grinding. Excess air is filtered through a cotton balloon at the top of the cyclone dust collector. Particle size can be varied by interchanging screens of different hole size.

The gap between the hammer and the liner maintained such that, the grinding due to shearing is very effective which ensures low wear and tear due to aberration. In Pilot Hammer Mill because of abandon flow of air through the raw material, the product and the machine remains in moderate temperature which protects the quality of raw material and life of the equipment. Due to the perfect design of the cyclone separator, air and product separation is very effective.

HAMMER MILL - EXPLODED VIEW



Sl.No.	DESCRIPTION
1	HOPPER
2	HANDLE
3	TEETH - 2 Nos.
4	HINGE PLATE (TOP)
5	BEARING BLOCK - 2 Nos.
6	FLANGE - 2 Nos.
7	SHAFT
8	BOSS FLANGE
9	BOSS END PLATE
10	BOSS PLATE
11	TIP TOOL
12	L PLATE - 2 Nos.
13	END CAP
14	HINGE PLATE (BOTTOM)
15	SIDE PLATE - LEFT
16	SIDE PLATE - RIGHT
17	GRILL
18	SIEVE
19	INLET TO BLOWER
20	BRACKET- 3 Nos.
21	HINGE PLATE FOR BLOWER
22	HINGE PLATE FOR INLET
23	BEARING BLOCK FOR BLOWER
24	END PLATE (BLOWER)
25	SHAFT FOR BLOWER
26	BLOWER FAN
27	BLOWER BODY
28	BRACKET- 4 Nos.
29	OUTLET PIPE
30	ROTATING FLANGE
31	BEND PIPE
32	CYCLONE TANK
33	CLEANING DOOR

TECHNICAL SPECIFICATION

Sl. No.	MODEL	CHAMBER D x W IN INCHES	POWER (HP)		OUT PUT CAPACITY (Kg./Hr.)					OVER ALL DIMENSIONS (cm.)			PV
			MAIN SHAFT	BLOWER	CHILLY	CORIANDER	TURMERIC	AYURVEDIC	CHEMICAL	L x B x H	FH	DH	
1	HM-12	12" x 6"	7.5 - 10	-	60	45	55	40	80	220 x 140 x 240	120	100	3.8 m^3
2	HM-15	15" x 8"	15 - 20	3	90	60	100	60	120	240 x 160 x 250	130	110	4.5 m^3
3	HM-20	20" x 10"	25 - 30	5	130	90	140	130	200	280 x 200 x 280	150	130	7 m^3
4	HM-25	25" x 12"	40 - 50	7.5	250	130	270	220	400	350 x 260 x 380	180	150	14.5 m^3
5	HM-25 (XL)	25" x 18"	50 - 60	7.5	300	200	350	280	480	380 x 260 x 380	180	150	15 m^3
6	HM-30	30" x 18"	60 - 75	10	400	300	500	320	550	420 x 350 x 450	180	180	22 m^3
7	HM-30 (XL)	30" x 24"	75 - 100	10	550	400	700	550	750	450 x 350 x 450	220	200	23 m^3
8	HM-36	36" x 18"	100 - 125	15	700	600	900	600	950	480 x 380 x 550	280	250	32 m^3
9	HM-36 (XL)	36" x 24"	150 - 170	20	1100	900	1300	1000	1500	500 x 380 x 550	280	250	33 m^3

For aberrations please refer page 24

Above model hammer mills are fabricated with MS and alloy metals. For fully SS fabricated machine add (SS-F) with the existing model number. Add (SS-C) for Machines fabricated with SS contact parts.

eg: HM-15 change to HM-15 (SS-F) or HM-15 (SS-C).

HAMMER MILL (CS)

IDEAL HAMMER MILL ASSEMBLY

1. Hammer Mill
2. Belt Guard
3. Basement
4. Anti-Vibration Mount
5. Motor
6. Airlock Valve
7. Cyclone Tank
8. Group Filter with Sheet Metal enclosure

* Optional Accessories

HYGRO CLEAR MILL - SIEVE TYPE

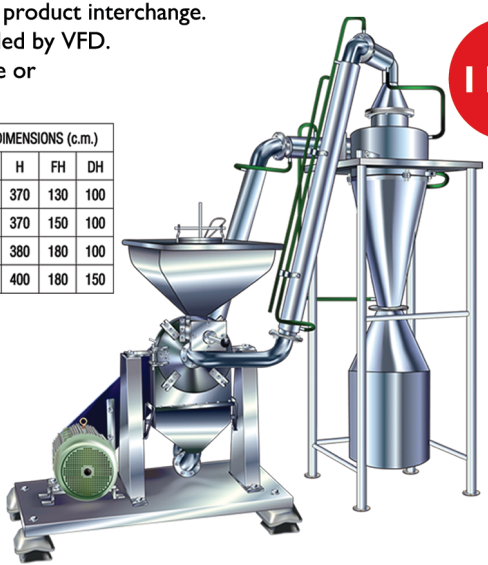
Pilot Hygro Clear Mill is a special purpose machine. It is ideal for grinding raw material of hygroscopic/ volatile/ low density in nature. The temperature of grinding can control by adjusting the temperature of the coolant circulating through the jackets on the material

Advantages:

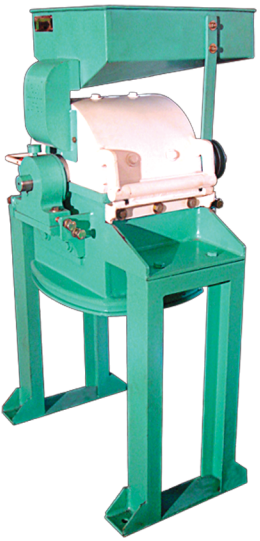
- Grinding done in fully enclosed system.
- No contact with atmosphere while grinding. Thus clean room is not compulsory.
- No addition of moisture from air while grinding.
- No loss of volatiles from raw material while grinding once the grinding line got saturated.
- Temperature can maintain normal or adjust as per the coolant temperature and its flow rate.
- Fully Dismantlable equipment for cleaning and product interchange.
- Raw material feeding is automatic and controlled by VFD.
- Collection of the ground product is batch wise or continuous(Optional).

Sl. No.	MODEL NUMBER	SIZE	TOTAL POWER (HP)	HOPPER VOLUME (LITRE)	OUT PUT CAPACITY (Kg./Hr.)			OVER ALL DIMENSIONS (c.m.)				
					HERBAL EXTRACTS	FREEZE DRIED VEG./PULSES	CHEMICALS	L	B	H	FH	DH
1	PHCS-12	12"	10 + 0.25	50	65	50	90	350	160	370	130	100
2	PHCS-15	15"	20 + 0.5	75	120	100	180	370	180	370	150	100
3	PHCS-20	20"	30 + 0.5	100	200	160	300	400	200	380	180	100
4	PHCS-25	25"	40 + 1	150	380	200	550	450	220	400	180	150

For aberrations please refer page 24



OPEN TYPE HAMMER MILL



Pilot open type Hammer Mill is functional wise same as mini pulveriser. But due to its large size and method of fabrication we classified into hammer mill section. As in Hammer Mill, here we are not providing blower and cyclone collector for powder collection. In Open type Hammer Mill ground powder is collected directly by cotton balloon as in mini pulveriser. Product fineness is determined by the hole size of the sieves fixed in the bottom periphery of the crushing chamber. The beaters of the machine are in fixed condition to shaft with horizontal replaceable hardened cutter head.

Two types of open type Hammer Mill:
(a) Single stage mill with 8 no. of beaters
(b) Double stage mill with 12 no. of beaters

Single stage mill is recommended for soft material grinding and double stage mill is recommended for hard material grinding, which gives very high sieve life up to 20 times that of single stage mill in case of hard material grinding.

Sl. No.	MODEL	POWER (HP)	OUT PUT CAPACITY (Kg./Hr.)			CRUSHING CHAMBER		OVERALL DIMENSIONS (cm.)					PV
			SPICES	PULSES	OTHERS	ØD	W	L	B	H	FH	DH	
1	815-S	15 - 20	60	200	160	378	205	170	80	150	150	55	2.0 m^3
2	815-2	15 - 30	100	300	250	378	315	170	90	150	150	55	2.3 m^3
3	1215	20 - 30	120	360	300	378	305	170	90	155	155	55	2.4 m^3
4	1020	25 - 40	150	450	375	515	250	200	110	180	180	70	3.9 m^3

For aberrations please refer page 24

DISINTEGRATOR

Disintegrator
standard model

The purpose of disintegrator is to break heavy and large size raw material in to small pieces upto 3000 microns. Material construction can be CS, SS-304, SS-306 or SS-316L. Main shaft is fitted in ball barings.

Sl. No.	MODEL	POWER (HP)	OUT PUT CAPACITY (Kg./Hr.)			CRUSHING CHAMBER		OVERALL DIMENSIONS (cm.)					PV
			HERBS	SHELLS	OTHERS	ØD	W	L	B	H	FH	DH	
1	D-12	5 - 7.5	25	40	50	300	150	110	85	120	110	75	1.1 m³
2	D-16	7.5 - 10	35	60	70	400	150	125	90	130	120	75	1.5 m³
3	D-22	15 - 20	75	130	160	550	200	168	100	153	136	85	2.6 m³
4	D-32	25 - 40	180	300	350	800	200	220	130	185	150	100	5.2 m³

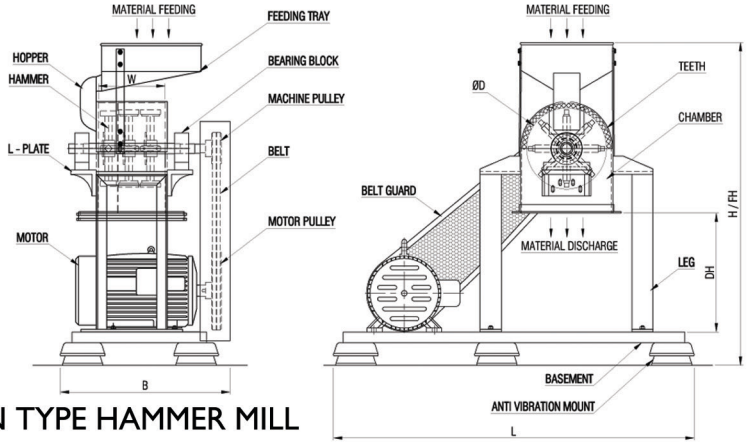
NOTE:- OUT PUT PARTICLES BETWEEN 100 MICRONS 4000 MICRONS For aberrations please refer page 24

Disintegrator with blower
& cyclone collector

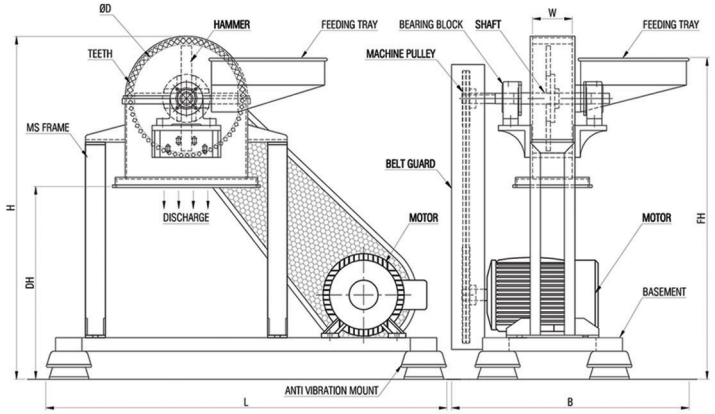
Disintegrator cum blower
with cyclone collector

❁ Optional accessories

LINE DIAGRAM



OPEN TYPE HAMMER MILL



ALL DIMENSIONS ARE IN mm
THE DIMENSIONS MENTIONED IN THE DRAWING ARE APPROXIMATE AND FOR GUIDANCE ONLY

DISINTEGRATOR

IMPACT PULVERISER

Pilot Impact Pulverisers are designed to meet the grinding requirements for hard and brittle raw material up to 50 microns without any spillage. Different size machines are available to meet the output requirements. Material of construction can be any material. Normally it is made of CS, SS or Alloy materials.

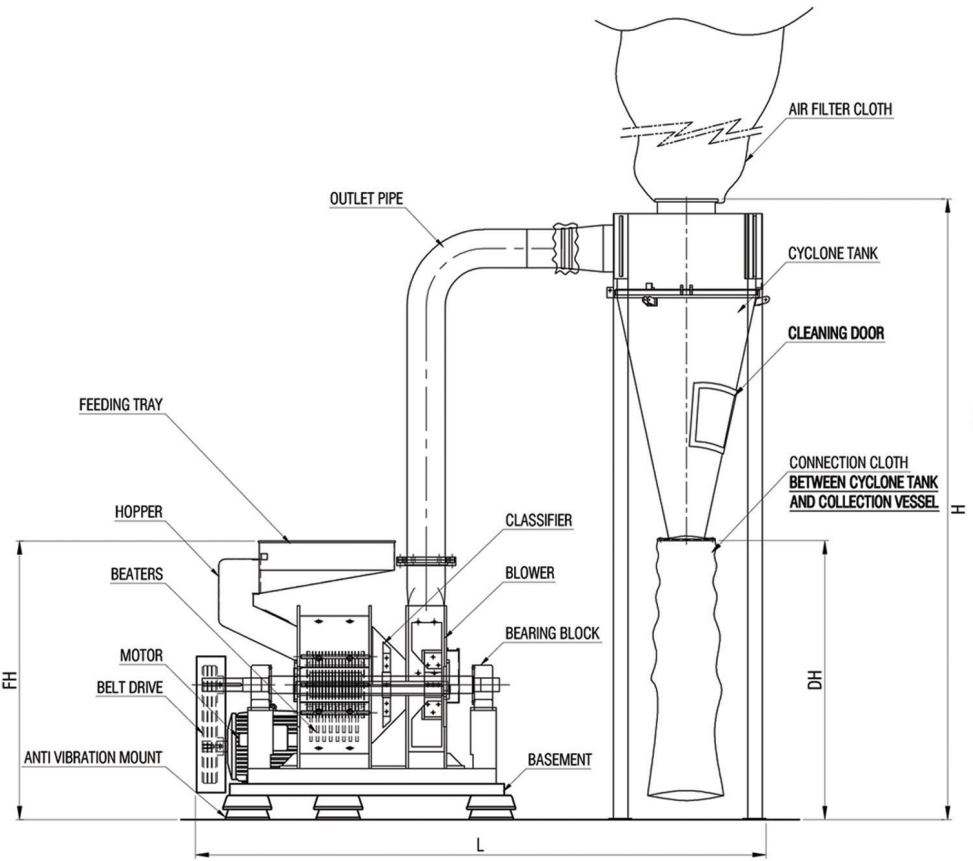
IMPACT PULVERISER - WORKING PRINCIPLE

Pilot Impact Mill consists of the following main parts. viz, grinding chamber, a set of hammers, rotating classifier, blower, cyclone tank and a set of cotton balloons. Raw material is fed to a grinding chamber lined by specially treated toothed steel liners. There is a set of precisely balanced fast rotating hammers which accelerates the material on to the liner. By the impact shear and material to material hitting, the material is broken into fine particles. From the grinding chamber the ground material is fed automatically to a classifier where the material get separated as fine and coarse. The fine material is sucked by a blower and discharges through cyclone separator. The coarse material returns to the grinding chamber for further grinding. The beaters are easily replaceable. The use of classifier eliminates the use of screens and hence their replacements. Particle size is determined by setting the gap between cone and classifier and also by adjusting air flow in the pipe line to cyclone tank.

Sl. No.	MODEL	POWER (HP)	CHAMBER D x W IN INCHES	OUT PUT CAPACITY (Kg./Hr.)				OVERALL DIMENSIONS (cm.)			PV
				TURMERIC	AYURVEDIC	CHEMICAL	CLAY	L x B x H	FH	DH	
1	IP-12	10 - 15	12" x 8"	30	20	50	70	200 x 165 x 240	100	110	4 m^3
2	IP-15	15 - 20	15" x 10"	50	35	80	110	220 x 180 x 260	100	120	4.5 m^3
3	IP-20	25 - 30	20" x 12"	100	60	140	150	250 x 220 x 280	120	120	6.5 m^3
4	IP-25	30 - 40	25" x 12"	160	90	200	225	280 x 230 x 300	125	120	9.5 m^3
5	IP-32	40 - 60	32" x 14"	330	220	350	400	320 x 260 x 340	130	150	13.5 m^3
6	IP-36	60 - 80	36" x 16"	520	300	550	600	360 x 280 x 380	140	150	17 m^3
7	IP-42	100 - 125	42" x 18"	650	450	700	750	400 x 320 x 420	150	165	24 m^3
8	IP-48	150	48" x 20"	1200	700	1100	1200	440 x 350 x 450	180	180	28 m^3

For aberrations please refer page 24

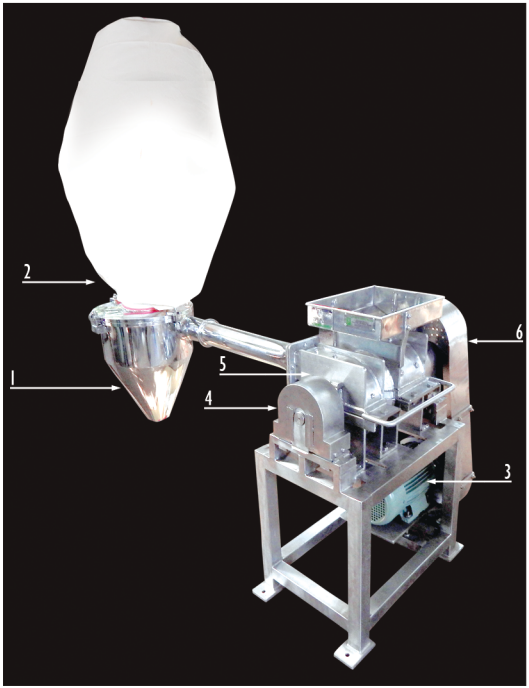
IMPACT PULVERISER - LINE SKETCH



For aberrations please refer page 24

IMPACT PULVERISER (LAB MODEL)

This machine is extremely good for lab purpose fine grinding up to 50 - 300 microns depending on nature of material. Output capacity is 2 kg - 10 kg/Hr. Power required is between 2 to 5 HP. Machine has minimum air pipe length as there is no bend pipes. Working principle same as that of Impact Pulveriser. The construction of contact and visible parts are in SS-304 (SS 316 is optional).

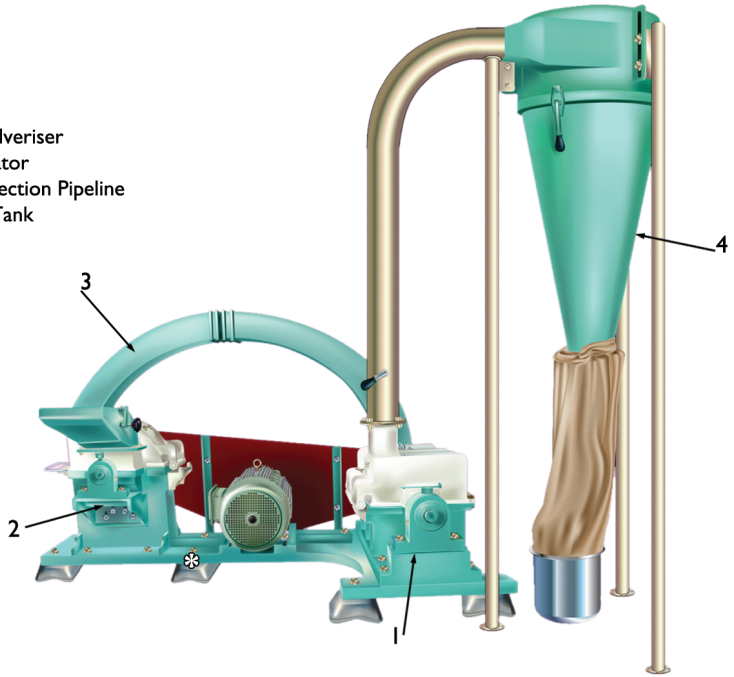


1. Cyclone tank
2. Filter Balloon
3. Motor
4. Bearing block
5. Blower
6. Belt guard

AYURVEDIC MILLING SYSTEM

This is a combination of Disintegrator and Impact Pulveriser (or Hammer Mill) fitted on a common basement along with the motor. Material fed into the disintegrator, will be transferred to the next machine for fine grinding through a arch bend pipe. The fine ground material from the Impact Pulveriser is collected through the cyclone tank. Sizes available from 12 inch to 36 inch chamber diameter suitable to operate with 10 HP to 75 HP motor.

1. Impact Pulveriser
2. Disintegrator
3. Interconnection Pipeline
4. Cyclone Tank



* Optional accessories

HYGRO CLEAR MILL - CLASSIFIER TYPE

Purpose of this machine is to grind raw material of hygroscopic/ volatile in nature up to 50 microns. This machine has all the advantages mentioned in the page No. 11.

Sl. No.	MODEL NUMBER	SIZE	TOTAL POWER (HP)	HOPPER VOLUME (LITRE)	OUT PUT CAPACITY (Kg./Hr.)			OVER ALL DIMENSIONS (cm.)				
					HERBAL EXTRACTS	FREEZE DRIED VEG./PULSES	CHEMICALS	L	B	H	FH	DH
1	PHCC-12	12"	10 + 0.25	50	50	40	70	350	160	370	130	100
2	PHCC-15	15"	20 + 0.25	75	100	80	140	370	180	370	150	100
3	PHCC-20	20"	30 + 0.5	100	150	130	200	400	200	380	180	100
4	PHCC-25	25"	40 + 0.5	150	300	160	400	450	220	400	180	150

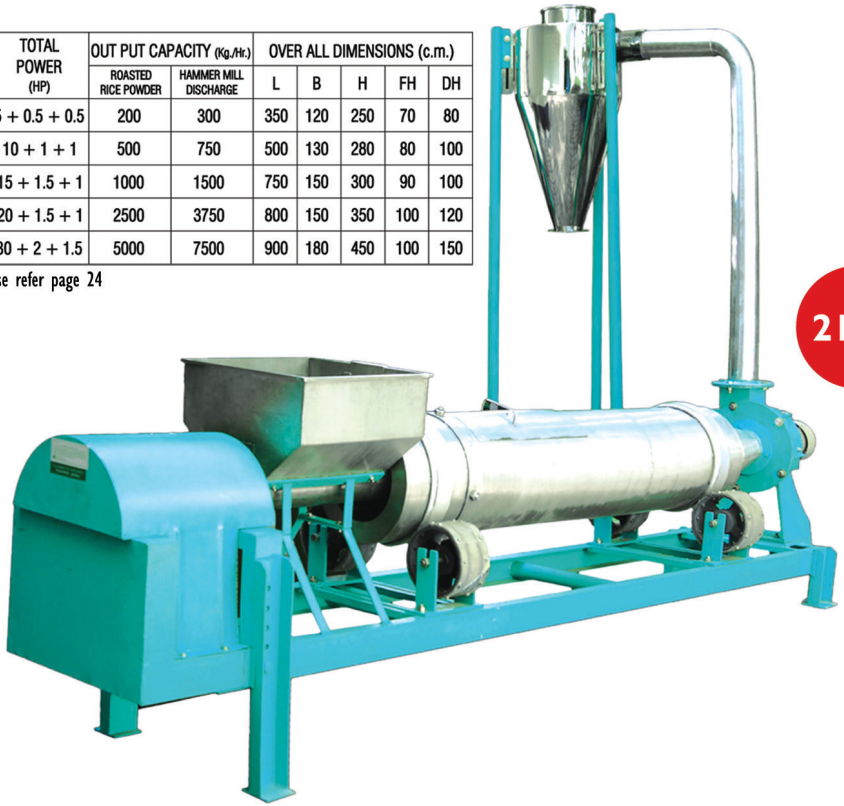
For aberrations please refer page 24

COOLING MACHINE

This machine is used to cool the powders after roasting or grinding. The powder is cooled pneumatically and the equipment in maintained normal temperature by flowing water through jacket.

Sl. No.	MODEL NUMBER	TOTAL POWER (HP)	OUT PUT CAPACITY (Kg./Hr.)		OVER ALL DIMENSIONS (c.m.)				
			ROASTED RICE POWDER	HAMMER MILL DISCHARGE	L	B	H	FH	DH
1	PPCM-200	5 + 0.5 + 0.5	200	300	350	120	250	70	80
2	PPCM-500	10 + 1 + 1	500	750	500	130	280	80	100
3	PPCM-1000	15 + 1.5 + 1	1000	1500	750	150	300	90	100
4	PPCM-2500	20 + 1.5 + 1	2500	3750	800	150	350	100	120
5	PPCM-5000	30 + 2 + 1.5	5000	7500	900	180	450	100	150

For aberrations please refer page 24



WOOD CHIPPER

Pilot wood chipper is very effective to chip the wood into small bits like match sticks. In this machine big wooden logs can feed directly to the crushing chamber and keep it close until fully got chipped. Overload comes on the beaters adjusted automatically due to the excess space provided in the crushing chamber. This machine classified as per the length of the log it can handle.

Sl. No.	MODEL NUMBER	POWER (HP)	INPUT SIZE (D x L) (c.m.)	OVER ALL DIMENSIONS (cm.)			OUT PUT CAPACITY (Kg./Hr.)
				L	B	H	
1	PWCR-7.5	7.5	Ø5 x 30	150	100	180	50
2	PWCR-15	15	Ø7.5 x 45	190	100	180	100
3	PWCR-25	25	Ø10 x 75	220	100	180	200
4	PWCR-40	40	Ø15 x 100	250	120	200	500

For aberrations please refer page 24

AIR FILTERS

Group filter with
Air purging system

As the name indicates air filters are mainly designed to filter the air from dust. In grinding machines, air discharged from cyclone separator is passed through the filter to separate any particles remains in the exhaust air. The filtering area is very important for easy air flow through it. For that, number of balloons provided in group filter. Nonstick synthetic materials and sometimes Teflon filters are also used for easy cleaning of balloon from dust stuck to that. Air purging is provided in certain cases for automatic cleaning of filters. A preset electronic system controls the interval of air purging.

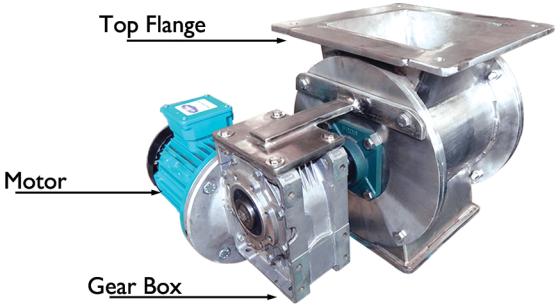
Sometimes single big cotton balloons are also used for low cost and easy replacement while products change in the machine. Although it is sufficient for small machines up to 40 HP, we are not recommending for big machines. Filter cloths are classified as per its micron sizes and material of construction.

Sl. No.	MODEL	AIR FLOW C.F.M.	POWER (HP)	OVER ALL DIMENSIONS (cm.)		
				L	B	H
1	PGFAP- 2100	2100	3	140	140	350
2	PGFAP- 3200	3200	5	150	150	450
3	PGFAP- 4000	4000	7.5	165	165	500

For aberrations please refer page 24

ROTARY AIR LOCK VALVE

As the name indicates, rotary air lock valve is used in such areas where air has to be locked while the product discharges continuously. This helps to minimise the spillage. it is usually fitted at the discharge point of a cyclone separator. Here the air is locked between the wane and casing. Different sizes are available as per the material handling capacity.



Air Lock Valve

Sl. No.	MODEL	POWER (HP)	CAPACITY (Kg/Hr)
1	PALV- 250	0.25	250
2	PALV- 1500	0.5	1500
3	PALV- 3000	1	3000
4	PALV- 5000	1.5	5000

AISI - AMERICAN IRON AND STEEL INSTITUTE
B - BREADTH
CFM - CUBIC FEET PER MINUTE
CI - CAST IRON
CM - CENTIMETER
CS - CARBON STEEL
D - CHAMBER DIAMETER
DH - DISCHARGE HEIGHT
FAD - FREE AIR DISCHARGE
FH - FEEDING HEIGHT
H - HEIGHT (WITHOUT AIR FILTER CLOTH)
HP - HORSEPOWER
Hr - HOUR
Kg - KILOGRAM
L - LENGTH
M^3 - METER CUBE
PV - PACKING VOLUME
SS - STAINLESS STEEL
VFD - VARIABLE FREQUENCY DRIVE
W - WIDTH