

# VERTICAL SHAFT IMPACTOR (VSI)

Superior CUBICAL Aggregates & Quality Sand

**German**  
**Technical**  
Know how



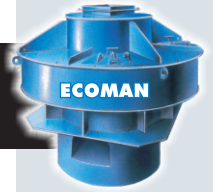
Low Maintenance Cost & High Return



PERFECTION IN SIZE REDUCTION TECHNOLOGY

**ECOMAN**

# HOW VSI WORKS ?



VSI is nothing but a Centrifugal “**STONE-PUMP**”. Stones are fed into centre of the rotor (like water in the centrifugal pump) & stones are thrown outwards towards the periphery by centrifugal force.

Feed material is fed through a vertical tube in the centre of the horizontal rotor rotating at high speed (**55 M/Sec to 65 M/Sec**) around a vertical axis. Feed material due to centrifugal force starts picking up speed and it starts getting distributed over the distribution cone & as the material travels over the rotor-vanes, towards the periphery attains the same speed as speed of rotor’s periphery. At the instant of alighting from the rotor, material attains a velocity which is the resultant of peripheral velocity and radial velocity (due to centrifugal force) and direction of the resultant velocity is almost 45 degrees to radial direction.

**Kinetic energy** of these feed particles, is so high that after impact, against the breaking surfaces stresses developed within the particles overshoot their ultimate strengths and thereby particles disintegrate into number of pieces giving rise to new surfaces.

## ***IT IS THE VELOCITY & VELOCITY ALONE DECIDES THE AMOUNT OF FRAGMENTATION***

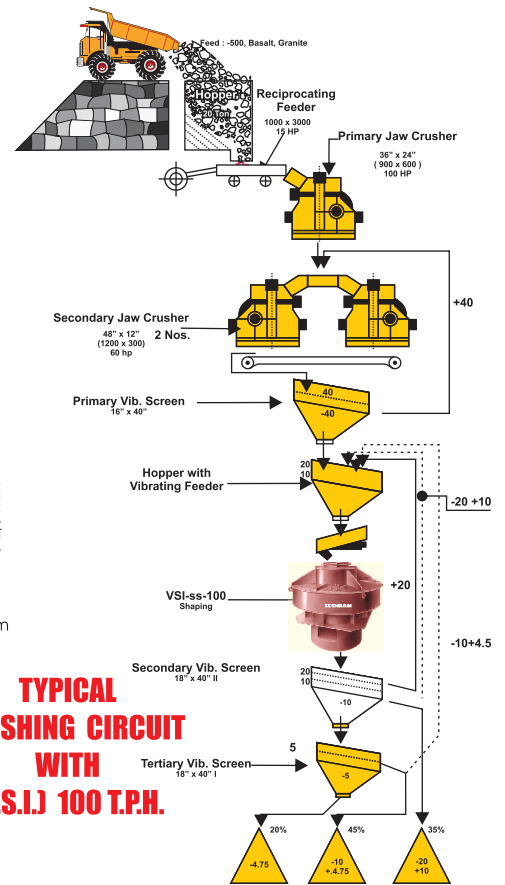
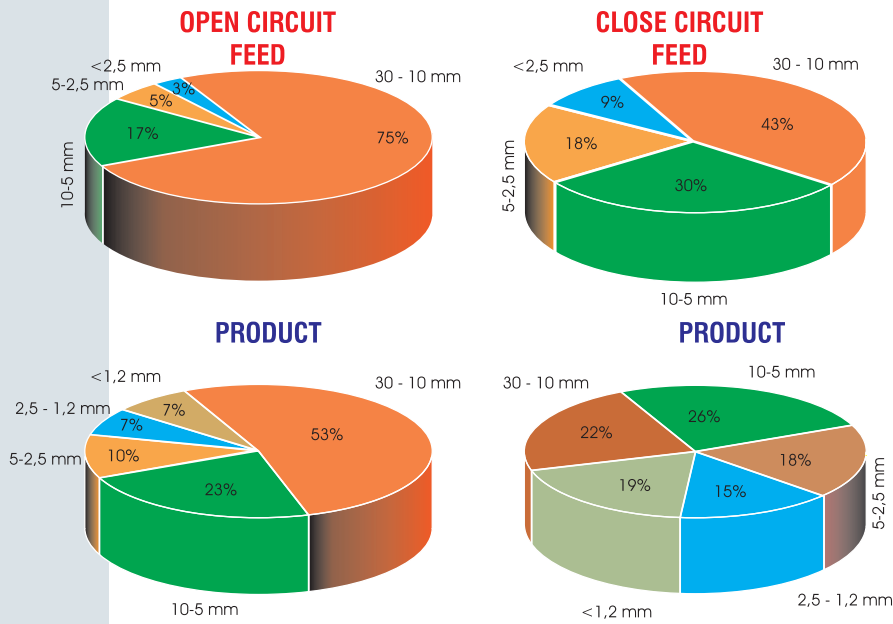
Therefore VSI is in true sense a **Pure Impact Crusher** which crushes only by Impact. Not like other conventional Impact Crushers, where shear, compression, attrition & impact allocations, play the role in crushing the material.

In VSI there is no gap setting. Crushed material falls through the annular open ring area by gravitational force only.

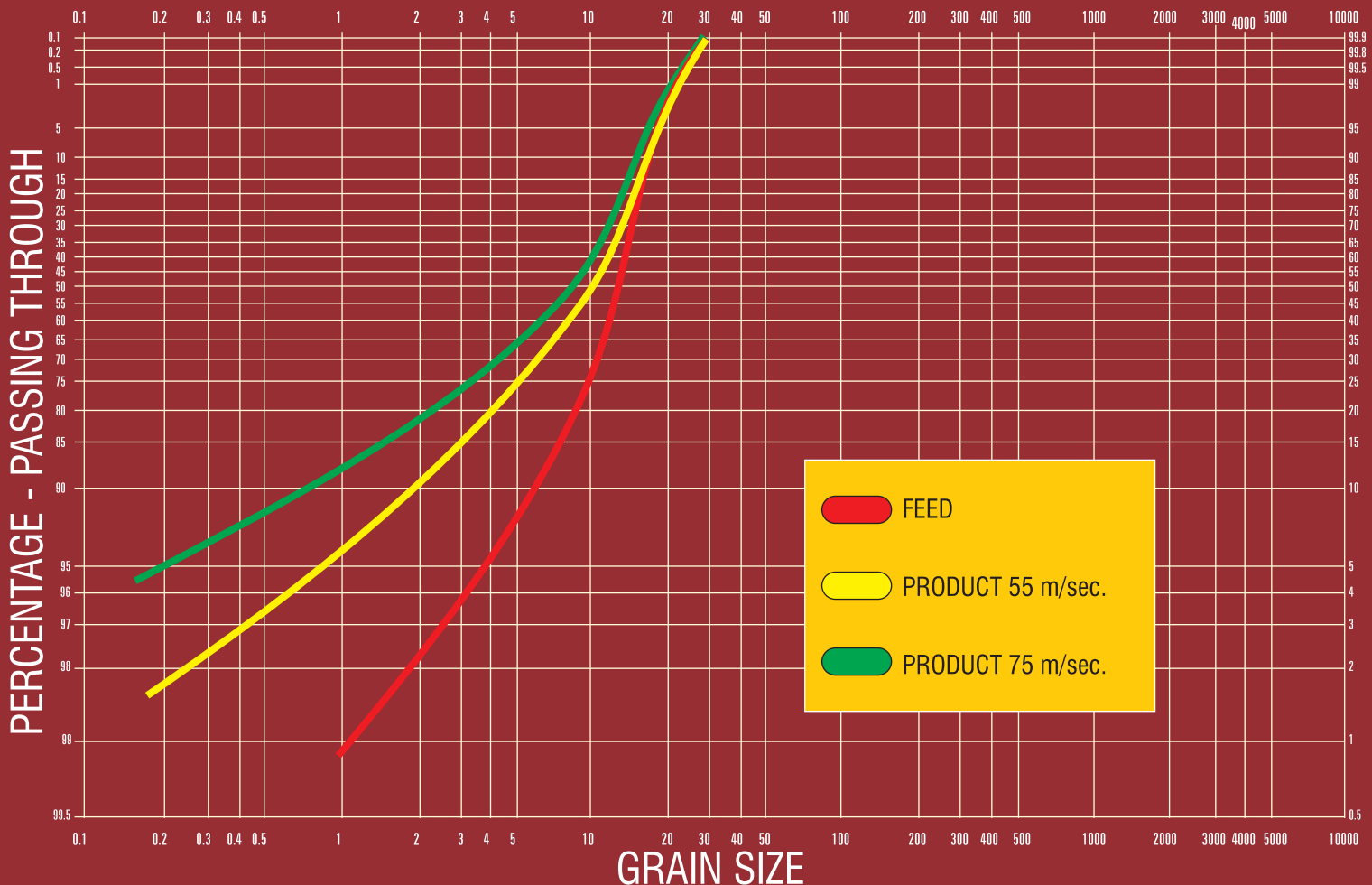
**ECOMAN** manufactures **Stone-on-Stone** type of Vertical Shaft Impactor

Rotor is so designed that, stone layer gets formed on the vane & breaking surface is also formed by material built up. Thereby reducing the wear on the vanes & breaker walls. But this cushioned surfaces, reduce considerably the amount of crushing. But amount of **spare consumption also gets reduced.**





## ECOMAN STONE-ON-STONE VSI





# POINTS TO REMEMBER



1.

One should clearly understand, that **Stone-on-Stone V.S.I.** is primarily a “**SHAPING MACHINE**” & not a harsh heavy reduction crushing machine. Heavy size reduction has been intentionally avoided in Stone-on-Stone V.S.I. by providing a “**SOFT CUSHIONED IMPACT**”, so that, material is not reduced to desired product size in one pass, but it attains the desired product size, only after 3-4 passes or more, This has been done intentionally.

2.

Therefore quite a high recirculating load is essential. And that is how cubical shape achieved by Stone on Stone type V.S.I. is very much superior to cubical shape obtained by any other existing crushing equipments.

3.

Therefore, **throughput capacities are very high** and should not be confused with the ultimate product out-put capacities. Invariably throughput capacity has to be 1.5 to 5 times of output capacities. For instance, sand manufacturing V.S.I. of output capacity of 20 TPH, should have say 100 TPH throughput capacity.

Therefore, capacities of feeding equipments and recirculating equipments should be based on throughput capacities and not on output capacities.

4.

Ensuring of **no over sized material** is fed to V.S.I. is very vital. Even on occasionally, one or two pieces can be harmful, as these pieces may choke up in the feed tube or block the passages in the rotor. Rotor will get imbalanced & if continued to run further may damage the bearings.

Therefore **pre-screening prior to feeding into V.S.I. is very essential.** Even cardboard pieces, papers, clay lumps & cotton waste etc., can block the passages. Upper limit of feed size, i.e. maximum feed size should be very strictly controlled.

5.

Feeding continuously, without interruption at rated throughput capacity gives best results. It increases outputs & shape of aggregates, gets further improved.

6.

Surface velocity of rotor decides the ratio of reduction. For finer end product, higher speeds are required. For standard aggregates, 45 m/sec is good speed but for finer products higher speed even upto **70 m/sec to 80 m/sec** are used.

7.

It is very much advantageous & advisable to make provisions in the crushing circuit, in such a way that all the **separated sizes in desired proportion can be fed back to V.S.I.** to further improve desired grain analysis in the product.

8.

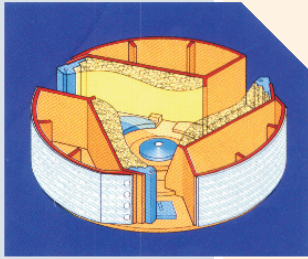
As the material is always flowing over the material bed and impacting also on material built-up, wear & tear of the components is minimized & therefore **spare parts consumption per ton of aggregates produced is very low**; especially when compared with conventional impactors.

9.

In case of bigger size V.S.I. twin motor drive should be selected. One motor will bring the V.S.I. to full speed, then the other motor is brought into operation. Thereby starting heavy currents are reduced considerably. This arrangement is very useful especially when plant is running of D.G. Set.



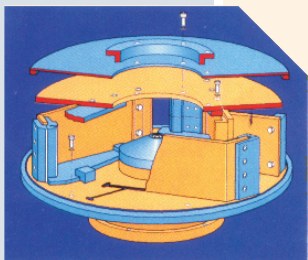
# INSIDE THE CHAMBER



## Closed Rotor

(Welded Construction)

- Material Build up
- Main Body
- Wear Components
- Hard facing (Rebuilding)

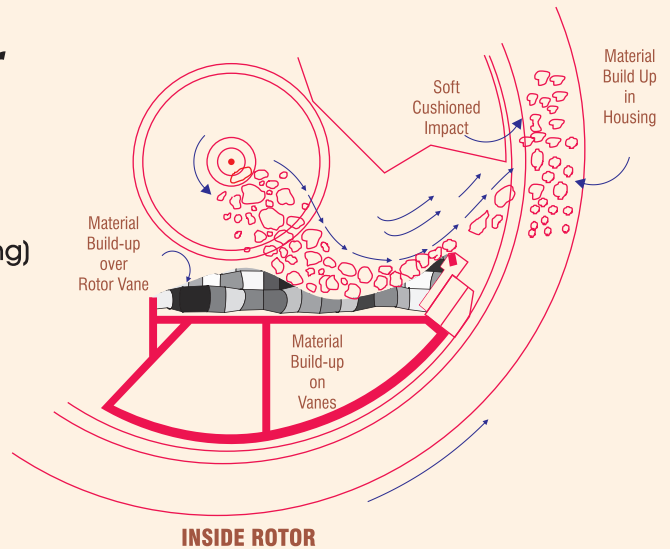


## Open Rotor

(Bolted Construction)

- Main Body
- Wear Components

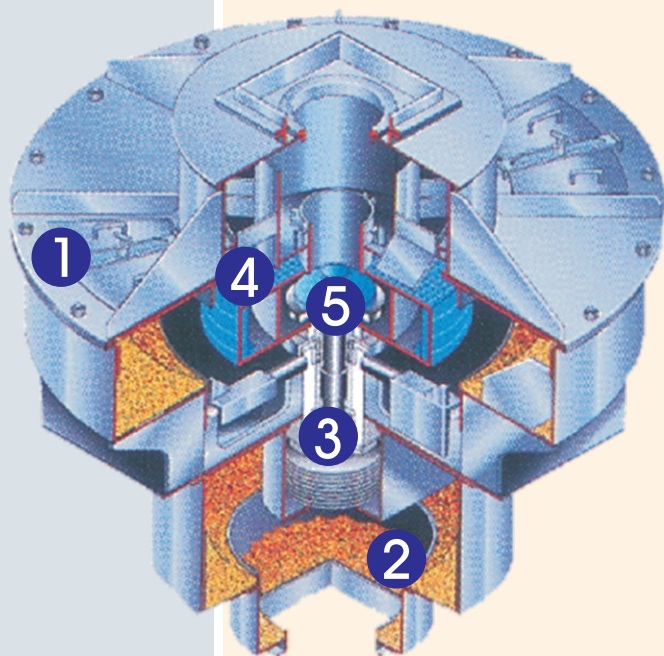
Dry Working  
(For Wet working refer to us)



The costs of wear can be reduced upto 50% per ton of material throughput!

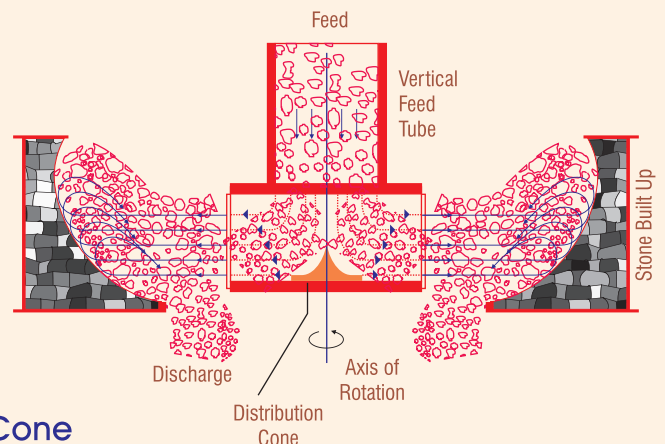
**TRADITIONAL IMPACTOR**

**ECOMAN VSI IMPACTOR**

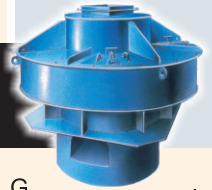


- ① Inspection Door
- ② Material Build up
- ③ Perfect sealing of bearings
- ④ Easy Replaceable Rotor
- ⑤ Distribution Cone

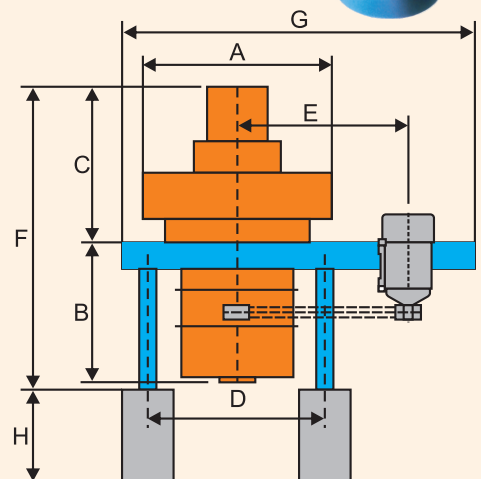
**WITHIN THE ROTOR**



# Dimensional & Application Details



TYPE	A	B	C	D	E	F	G	H
35	1630φ	1150	1411	1390	1045	2500	2718	1000
55	1866φ	1398	1533	1760	1700	3031	3490	1000
80	1866φ	1398	1533	1760	1700	3031	3490	1000
110	2484φ	1460	1690	2010	1820	3150	4040	1100
160	2484φ	1460	1690	2010	1820	3150	4040	1100
220	3005φ	2129	1994	2750	2300	4221	4836	1100
330	3005φ	2129	1994	2750	2300	4221	4836	1100



## Crusher data



Type	35	55	80	110	160	220	330
Max. feed size +	0-33	0-35	0-35	0-40	0-40	0-50	0-50
Throughput (TPH/BRASS)	40/10	70/17.5	90/22.5	130/32.5	160/40	220/55	280/70
Product Output	0-2 mm	8-12	12-16	16-24	25-30	30-40	50-70
Capacity TPH	0-4 mm	15-20	20-25	23-30	35-40	50-70	70-90
Diameter in mm	610	780	780S	1000	1000S	1200	1200S
Surface speed m/sec	40-62	45-65	45-65	45-65	45-65	35-60	35-60
RPM	1300-2000	1100-1600	1100-1600	860-1250	860-1250	560-1000	560-1000
Power in KW/HP	55/75	75/100	90/120	160/215	200/270	250/335	300/400
V-Belt	4 x SPB	5 x SPC	6 x SPC	6 x SPC	6 x SPC	8 x SPC	8 x SPC
Wt. in Kgs. approx	2700	5000	5200	7000	7500	8000	8200
Motor Pulley (mm)	236	250	265	400	400	540	540

Note : 1 Brass = 4 ton (approx.)

Life of tips with different applications.  
**Product - 0-4 mm**



Mineral	Hrs Apprx.
Mineral with 15% Quartz	1300 - 1500
Mineral with 60-90% Quartz	500 - 1500
Clinker	4000 - 8000
Granite/Basalt	1000 - 7000
Limestone	4000 - 12000
Corundum	250 - 500
Blast Furnace Slag	3000 - 4000
Bauxite	500 - 1000

Above Non-binding values vary considerably.

In Technical Collaboration with **MARTIN STECKERT**, Germany



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**ECOMAN**

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