



**Soon Strong Machinery
Works Co.,Ltd**
申川機械工廠股份
有限公司



Vertical Roller Mill SVRM series

- Low operation and maintenance cost
- High capacity
- High quality & ultra-fine products
- Compact design

申川豎磨機系列

- 低操作及維修成本
- 高產量
- 高品質與超微細產品
- 簡潔設計

Work Principle

Grinding

Soon Strong VRM (See Fig.1) three or more grinding rollers travel over a circular bed of material resting on a revolving grinding table. The material is constant fed centrally onto the grinding table and carried onto the disk edge by centrifugal force to be a thin grinding layer then ground by grinding rollers with high hydraulic pressure.

Preliminary classifying & grinding circuit

The ground material developed inside the mill contacts with a high speed air flow to Soon Strong classifier and performed drying process by grinding heat.

The remaining portion of pulverized material is thus carried into a classifying zone where air classifiers are installed. The air classifier has inverter to various wheel rotation speed to classified the ground material which you wanted.

Oversize particles rejected by the classifier fall back into the center funnel onto the grinding table eventually while the fines are swept with air out of the mill.

Feed requirement & 產品

*Inlet size: Under Dia.15mm

*Hardness: Under Mohs 6

(special design for Above 6)

*Quartz Content: Under 5%

*Product size range: $d_{97}=10\sim50\mu\text{m}$ (1340~325 mesh)

*Moisture content: Under 5%

- ➡ Material 物料
- ➡ Air stream 氣流
- ➡ Coarse after classifying 分級後粗料

Fig.1

工作原理

研磨

申川豎磨機(見 Fig.1)三個或多個被動滾輪沿著主動圓盤邊緣滾動，原料從圓盤中心點上方隨時間定量落在圓盤中心然後因離心力平均分布在圓盤邊緣形成一層薄研磨層，滾輪經由高液壓系統驅動直接加壓於研磨層進而研磨物料。

初步分級及研磨循環

研磨過的物料隨著高速氣流到上方申川分級機中，物料在運送至分級機的過程中會因研磨產生的熱而有些許烘乾作用。

研磨後物料到分級機來進行分級，分級機由變頻器來變換輪葉轉速進而分級所需要的產品。

分級後，顆粒過大不適合的物料被分級機篩選出來而掉落至中間漏斗進而流至圓盤中心進行

進料條件 & 產品

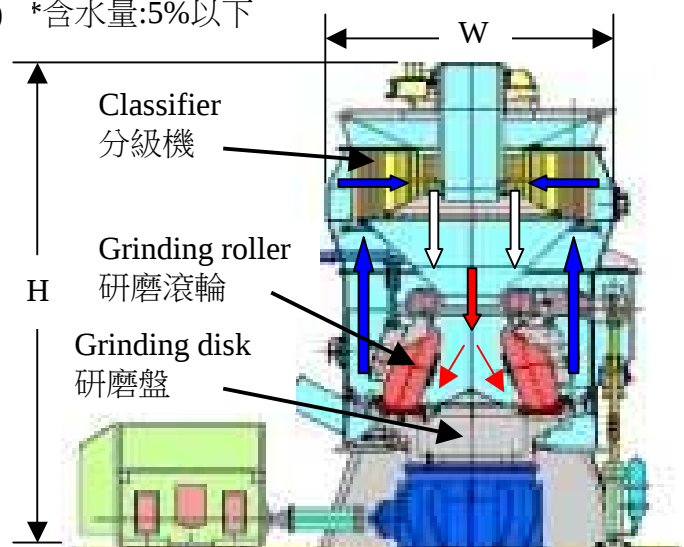
*進料大小:直徑20mm以下

*物料硬度:莫氏硬度6以下 (6以上需特殊設計)

*石英含量:5%以下

*產品細度範圍: $d_{97}=3\sim50\mu\text{m}$ (5000~325 mesh)

*含水量:5%以下



Material application

原料應用種類

Calcium carbonate

Limestone Marble Calcite Dolomite

Ceramic Materials

Feldspar Quartz Kaolin clay

Industrial Minerals

Barite Bentonite Coal Cokes Graphite Gypsum

Rock phosphate Slaked lime Talc Zeolite

碳酸鈣鹽

石灰石 大理石 方解石 白雲石

水泥材料

長石 石英 陶瓷黏土

工業用礦石

重晶石 火山黏土 煤炭 焦炭 石墨 石膏

磷酸鹽石 熟石灰石 滑石 沸石

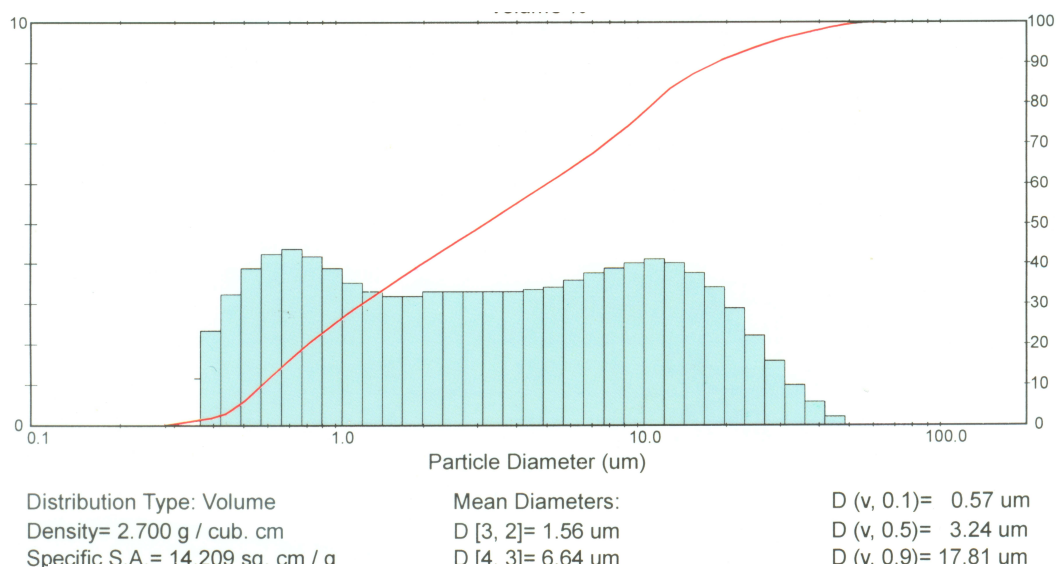
SVRM Specification 豎磨機規格

Model No. 型號	Mill power 磨機馬力	Classifier power 分級機馬力	Classifier (Q'ty X Dia.) 分級機 (數量 X 直徑)	Capacity 產量 d ₉₇ =10 μ	Capacity 產量 d ₉₇ =20 μ	Dia. 尺寸 (WXH)
SVRM-750C3	100kw (130HP)	11kw (15HP)	3 X 315 (mm)	2 T/H	4 T/H	
SVRM-1100C5	200kw (265HP)	11kw (15HP)	5 X 415 (mm)	4 T/H	8 T/H	4.2X6.1 (m)
SVRM-1200C5	300kw (400HP)	15kw (20HP)	4 X 500 (mm)	6 T/H	12 T/H	4.6X7.1 (m)
SVRM-1500C6	450kw (600HP)	15kw (20HP)	6 X 500 (mm)	9 T/H	18 T/H	

The capacity as list shown is took standard on grinding limestone. The real capacity is depended on material specification & fineness of requirement.

表格中產量是以碳酸鈣為標準，實際產量依物料性質及要求細度情況而定

SVRM-1050C5 particle size distribution chart 顆粒細度分布表



Limestone particle distribution chart 碳酸鈣顆粒分佈表

Operation results of limestone filler grinding system 碳酸鈣產品分析結果

SVRM-1050C5			
Capacity 產量:7~8 Ton/hr		Moisture content 濕度含量:	0.1%
Fineness 細度:S.A=15000±1000cm ² /g		Separator speed 分級轉速:	1850 rpm
d ₁₀₀ : 35 μ m (Cut point 切點)		Hydraulic pressure of grinding roller:	
d ₅₀ : 2 μ m		滾輪油壓壓力:	85 kg/cm ²
Capacity 產量:2.5 Ton/hr		Gas volume 風量	
Fineness 細度:S.A=23000±1000cm ² /g		Mill outlet 磨機出口:	330 m ³ /min
d ₁₀₀ : 16 μ m (Cut point 切點)		Fan inlet 風車進口:	350 m ³ /min
d ₅₀ : 1.3 μ m		Pressure draft 壓差	
Power consumption 電力消耗		Mill inlet 磨機進口:	-120 mmAq
Mill 磨機:	22 kwh/ton	Mill outlet 磨機出口:	-1050 mmAq
Separator 分級機:	6.5 kwh/ton	Fan inlet 風車進口:	-1250 mmAq
Fan 風車:	17 kwh/ton	Vibration at input shaft of SVRM reducer	
Total 總和:	45.5 kwh/ton	豎磨機減速機振動值:	< 4 mm/s
產品中另有其他細度與產量可供分級(見下表) It has another Fineness & Cap. to separate (See below)			

Surface area (S.A) 比表面積(cm ² /g)	Particle distribution 粒徑分佈(μm)			Product SPEC. 產品規格(mesh)	Cap.產能 (Ton/h)	Electricity consumption 耗電量 (kw)	Consumption ratio 比耗電量 (kwh/ton)
	d ₅₀	d ₉₇	d ₁₀₀				
23000±1000	1.3	5.0	13.0	2500	1.5~2.2	375	202
20000±1000	1.5	7.0	19.0	2000	2.2~3.2	380	140
18000±1000	1.8	10.0	23.0	1600	3.5~4.5	385	96
15200±500	2.3	13.0	30.0	1200	7.0~8.0	398	53
14000±500	3.2	20.0	38.0	1000	8.0~9.0	400	47
12000±500	4.2	28.0	48.0	800	8.5~10	405	44
10500±500	5.6	36.0	58.0	600	9.5~12	390	38

SVRM Feature

- Under S.A=23000cm²/g products is no need 2nd classifying equipment to classify. It could be produced directly from SVRM.
- Grinding liners is made on high wear resistant with high chrome alloy for disk and rollers to provide high quality to customer.
- Without changing wearing of rollers & disk in 5 years for grinding limestone on user experience record that would be an advantage on cost & fix

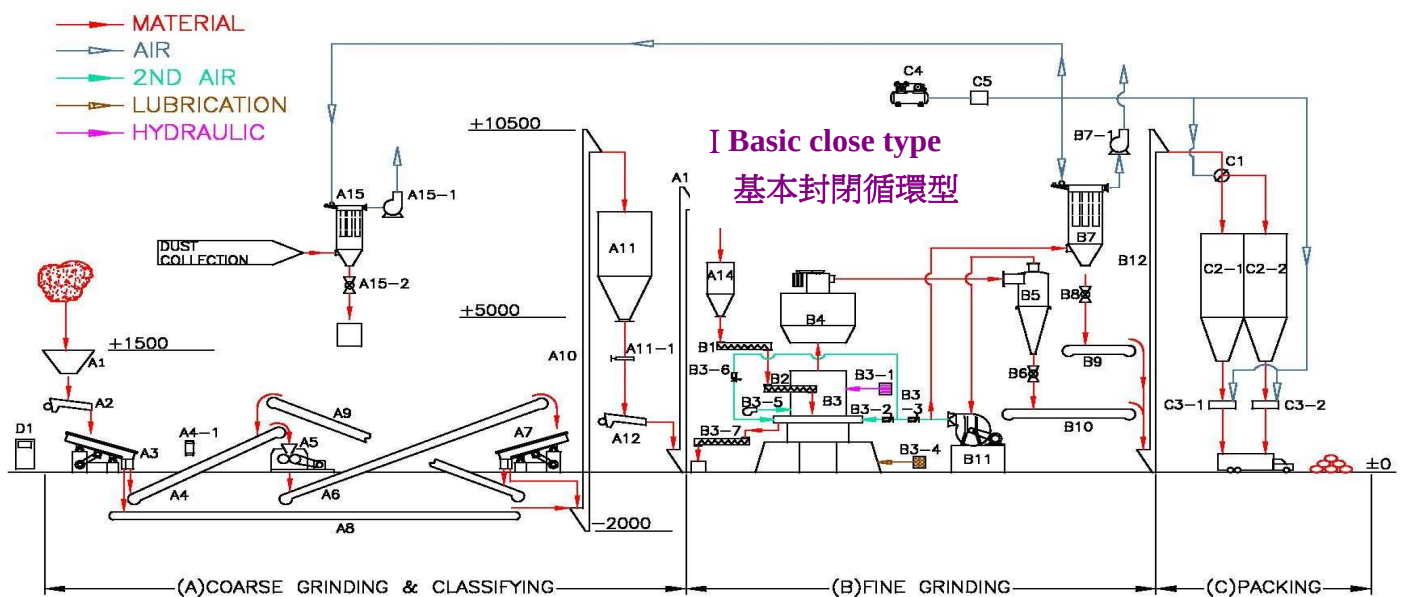
申川豎磨機特點

- 產品比表面積在23000cm²/g以下不須經過二次分級設備，可直接從豎磨機生產
- 磨盤與滾輪外部耐磨板為高磨耗性高鉻合金鋼，給客戶提供最高的品質
- 根據使用者經驗在磨碳酸鈣有5年不用換滾輪與磨盤記錄，對節省成本與維修有優勢

- Module design of disk and rollers for easy maintaining or exchanging to save closing time.
- The product particle size & S.A is adjustable with high efficiency classifier with wide range during operation.
- Special seal against dust penetration for grinding roller bearings to reduce grinding attrition .
- Precisely computer control & adjust at inlet & outlet flow rate to keep SVRM production stable.
- Hydraulic-pneumatic compression of roller arms allows quick change of compression strength of the roller by change oil pressure in the circuit.

- 模組化設計讓你簡單方便替換或維修磨盤與滾輪，節省停機時間
- 高性能分級機在操作途中廣泛地選擇所需產品顆粒大小與比表
- 滾輪培林特殊氣密設計能阻絕粉塵能減少消耗
- 電腦化精密調整與控制進出口流量，確保豎磨機生產穩定
- 滾輪搖臂組採氣液壓共存設計，能吸收運轉時所帶來的快速變化的壓縮應力

Reference standard process flow drawing 參考流程圖



- Close type for SVRM air circuit.
- Single & multi classifier could be chosen.
- Material could be contained under 5% moisture for input without losing SVRM function.
- Less abrasion in belt conveyor. This design is suit for high abrasion material.
- section (A) circuit course grinding & classifying is for insured (B) fine grinding inlet size to avoid unnecessary grinding & decreasing production
- Minimum land size & altitude requirement in site up to be compared with other associations

- SVRM 空氣封閉循環型
- 單一或多個分級機可供選擇
- 丟入物料可含 5% 以下水份而不失豎磨機功能性
- 皮帶輸送減少磨耗量，適合高磨耗性物料輸送使用
- (A) 循環式粗碎與篩選可確保進入 (B) 細碎的細度，避免不必要的研磨與降低產量
- 與同業比較具有最小占地與廠高需求。

Customer needs to provide below data before require	客戶在詢問時須提供的資料
Products fineness and capacity 1. D ₅₀ & D ₉₇ particle size (μm) 2. Products surface area (S.A:cm ² /g) 3. Capacity (Ton/Hr) 4. Product cut point (μm)	產品細度與產量 1. D ₅₀ & D ₉₇ 顆粒大小 2. 產品比表面積(S.A:cm ² /g) 3. 產量(Ton/Hr) 4. 產品最粗收縮點(μm)
Mechanical properties 1. Material type 2. Hardness in Mohs 3. Specific weight 4. Input size in beginning 5. Bulk density 6. Moisture ratio 7. Corrosiveness to metal 8. Samples (Inlet material & final products)	物理性質 1. 原料種類 2. 莫氏硬度 3. 比重 4. 投料大小 5. 密度 6. 濕度比例 7. 對金屬的腐蝕性 8. 樣品 (原料與成品)

Auxiliary equipments for grinding mineral 研磨礦石附屬設備

Crusher 壓碎機 (Coarse grinding 粗碎)	Jaw Crusher 顎式壓碎機 Impact Crusher 衝擊式粉碎機 Hammer Mill 擊鎚式粉碎機 Roller Crusher 滾輪式壓碎機
Pulverizer 粉碎機 (Fine grinding 細碎)	Raymond Roller Mill 雷蒙式磨機 Vertical Mill 豎磨機 Ball Mill 球磨機 Pulverizer 粉碎機 Super Micron Mill 超細微粉碎機
Separator 篩選機 (Screen & Non-screen 有網與無網式)	Vibration Screen 振動篩選機 Microplex Air Separator 分級機 Air Separator 空氣分級機 Ultra-fine Air Separator 多輪超微分級機 Micron Separator 單輪超微分級機
Others: Conveyor, bins etc. 其餘輸送機, 儲料桶等	Packing Machine 包裝機 Pulsaire Collector 脈衝式集塵機 Rotary Valve 迴轉閥 Cyclone Collector 旋風收捕器 Screw Feeder 螺旋供料機 Belt Conveyor 皮帶輸送機



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