
Quotation

For

Gypsum Block Production Line

Capacity: 300 000—400 000m²/year

Specification: 667mm (Length) × 500mm (Width) × 80mm
(Thickness) (hollow)

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1. General Description

1.1 Scheme of product

1.1.1 Capacity

60-70m²/h (6-7 moulds for each hour, 30 blocks for each mould, 0.15m²for each block) 300,000—400,000 m²/y
Based on initial setting time ≤3min, final setting time ≤13min

1.1.2 Product Specification

667 (L) ×500 (W) ×80 (T) mm (hollow)

1.2 Main Technical Specification

1.2.1 Quality Standard

The quality of building gypsum is in accordance with Chinese National Standard “Gypsum Block” (JC/T698-1998), and should meet the following requirements:

| No. | Item | unit | Indices |
|-----|-------------------------------------|------|---------|
| 1 | Length | mm | 667±2 |
| 2 | Width | mm | 500±2 |
| 3 | Thickness | mm | 80±1 |
| 4 | Void ratio | | ≥30% |
| 5 | Bending strength within 2 hours | Mpa | 1.7 |
| 6 | Compressive strength within 2 hours | Mpa | 5 |

1.2.2 Production Specification

Produce hollow gypsum blocks which are 667mm in length, 500mm in width and 80mm in thickness

1.3 Requirement for Raw Materials

1.3.1 Building gypsum

| No. | Name | Indices |
|-----|--|----------|
| 1. | Fineness: 0.2mm, residue on square hole sieve (Wt%) | ≤10% |
| 2. | Initial setting time (min) | ≤5 |
| 3. | Fluctuation of initial setting time of each lot of materials (min) | ≤1 |
| 4. | Final setting time (min) | ≤13 |
| 5. | Fluctuation of final setting time of each lot of materials (min) | ≤2 |
| 6. | Bending strength 2h (MPa) | ≥2.1 |
| 7. | Compressive strength 2h (MPa) | ≥3.9 |
| 8. | Na ₂ O | ≤100 ppm |
| 9. | K ₂ O | ≤100 ppm |
| 10. | CL- | ≤10 ppm |
| 11. | Material temperature | ≤85°C |
| 12. | Standard consistency | ≤0.68 |

1.3.2 Forming Water

| No. | Item | Indices |
|-----|----------|----------|
| 1. | K+ | ≤100 ppm |
| 2. | Na+ | ≤100 ppm |
| 3. | Cl-- | ≤10 ppm |
| 4. | pH value | 6.5~7.5 |

1.4 Materials Balance Calculation

| No. | Name | Actual Consumption (kg/m ²) | Hourly Consumption (kg/h) |
|-----|-----------------|--|------------------------------|
| 1 | Building gypsum | 67 | 4020 |
| 2 | water | 54 | 3240 |

1.5 Public Utilities

1.6.1 Power

| | |
|------------------------------------|-------------|
| Total Installed Power Capacity | 31 kW |
| Actual Load Under Normal Operation | 25 kW |
| Voltage of Production Line | (220/380) V |
| Frequency of Production Line | 50 Hz |

The Buyer shall supply power to designated site according to the Seller's instruction

1.6.2 Water

| | |
|--|---|
| Water Consumption of the Production Line | ~2 t/h |
| water consumption for production | ~1.5 t/h |
| water consumption for equipment cooling | ~0.5 t/h |
| Water Pressure | ~0.25 MPa |
| Water Quality | Comply with civil drinking water standard |
| PH value | 6.5~7.5 |

The Buyer shall supply power to designated site according to the Seller's instruction

1.7 Working System

| | |
|--------------|------------|
| Working Days | 300 d/y |
| Shift | 3 shifts/d |
| Working Time | 24 h/d |

1.8 Manpower Requirement

| No. | Item | Person / shift | Shift / day | Person / day |
|-----|--|----------------|-------------|--------------|
| 1 | Forming | 2 | 3 | 6 |
| 2 | Carrying and air-cure(can be omitted if using manpower drying) | 2 | 3 | 6 |
| 3 | Packing section | 2 | 3 | 6 |
| 4 | Finished products carrying (forklift driver) | 1 | 3 | 3 |
| 5 | Checking and maintenance | 1 | 3 | 3 |
| | Total | 24 persons | | |

2. Brief Introduction of Process and Equipments

2.1 Process Introduction

2.1.1 Metering and weighing Section

2.1.1.1 Building Gypsum

The building gypsum in silo, according to the materials quantity in weighing silo, is conveyed quantitatively to weighing silo by screw conveyor, when the materials in weighing silo are up to the set value, the screw conveyor will stop conveying.

2.1.1.2 Water

The water in pipe system in plant will be sent to water-weighing tanks by electromagnetic valves. The electromagnetic valves will turn off when the water in water-weighing tanks is up to set value. A liquid indicator will be assembled on water tank and to set required values by DCS system.

2.1.2 Forming Section

The metered building gypsum is evenly conveyed to a mixer by a flash screw conveyor and the water is conveyed to the mixer by pneumatic valves. The evenly

~~mixed slurry by the mixer will be poured into forming machine, the hydraulic scraper will scrape out the upper surface tongue-and-groove, then hydraulic jacking out the formed gypsum blocks, then space clamp will move blocks to drying kiln car or to be air-cured.~~

2.1.3 Drying or air-cure section

The formed gypsum blocks can be dewatered by the way of air-cure or manpower drying, this can be decided by the owner, but we also can offer detailed proposal and quotation, which is not included in this quotation document.

2.1.4 Packing and storage section

The dried gypsum blocks can be packed by manual or mechanical way, the detailed proposal can be chosen by the owner. And we can supply full-automatic packing machine, but which is not included in this quotation document.

2.2 Electric Control System

2.2.1 Power Supply

The Buyer shall supply power to designated site according to the Seller's instruction.

2.2.2 Calculation of Electric Load

| Project | When using steam |
|------------------------------------|------------------|
| Total Installed Power Capacity | 31 kW |
| Actual Load Under Normal Operation | 25 kW |
| Voltage of Production Line | 220/380V |
| Frequency of Production Line | 50Hz |

2.2.3 Power Distribution in Workshop

The power is normally supplied with busbar or power cable. The power for control cabinet is supplied by the workshop power distribution cabinet or busbar directly from the LV switch cabinet of the substation. Power supply devices will be equipped in appropriate position, which supply temporary power for maintenance use. (Supplied by the Buyer)

2.2.4 Main Production Control

2.2.4.1 Design principle and design proposal

In order to meet modern requirements for gypsum block production line process, to ensure reliable running process equipments, steady process parameters, products quality and to improve production line operating ratio, so this project we adopt the advanced and reliable DCS control system to intensively oversee and operate and dispersedly control production line. We use open communication agreement, so our plant Management Information System (MIS) can be easily connected to DCS system, so the administrator can know actual production status at any time.

2.2.4.2 General description for DCS system

We use separated DCS system for gypsum powder production line and gypsum block production line.

Its main functions are:

- a. have the process flow drawing which displays dynamic equipments state and process parameters;
- b. display process equipments units, operating panels for single machines and the running state for equipments;
- c. display operating panel of process parameters and the grouping of process parameters;
- d. promptly display process parameters and its trend curve;
- e. detailed display loop and parameters adjustment;
- f. alarm display for process state;
- g. when the production line gives an alarm, it can display and record relevant parameters, display treatment methods, which can get rid of malfunction in time;
- h. display control system's state.

2.2.4.3 Application software

The application software for control system is an important software for controlling site, operation station and manage computer. It should be developed and debugged based on well known production line process characteristic, equipments characteristic and control system's software and hardware.

2.2.4.3.1 Logical control software function

To use keyboard and mouse to operate all motors, electric valves and electromagnetic valves and etc. used for production line according to the displayed flow drawing and

operating panel on operation station. The site control station is used for choosing equipment units, starting and stopping equipment units, starting and stopping single machine, emergency stopping and malfunction reset and etc..

2.2.4.3.2 Process control software function

To check, display and give an alarm to temperature, pressure, flow, valves, materials level, speed, current and etc; to operate valves and speed; to adjust and record important process parameters.

2.3 Introduction to main equipments

2.3.1 Gypsum powder weighing silo

It is a kind of silo type balance, uses high precision weighing sensor, its weighing precision is $\pm 0.5\%$.

2.3.2 Metering water tank

It is made of 304 stainless steel; with liquid level transmitter; its metering precision is $\pm 0.5\%$.

2.3.3 Mixer

It is made of stainless steel, with washing device on machine cover to wash the adhered slurry on hopper in time and to ensure equipments to be clean. Its mixing device uses flash mixer to make slurry be quickly and evenly mixed in mixer.

2.3.4 Forming machine

It adopts the advanced hydraulic jacking process of the world. Its mould cavity is coated with hard chrome, stainless steel. Its surface rigidity is more than **HRC65** and its surface finish is up to **0.1 μ m**. Its partition plate and side mould is made by digital controlled machining center, with the dimension precision more than **0.04mm**, which ensures the dimension precision of gypsum blocks. Its gland strips are made of macromolecule materials to avoid slurry leaking out.

2.3.5 Space Clamp

It is designed by two-dimension type, and its travel motor and clamp lifting motor are all controlled by frequency conversion, with orientation precision less than **1mm** to avoid damaging gypsum blocks. The clamping part uses imported super-thin air cylinder to make blocks have evenly clamping strength.

2.3.6 Central hydraulic station

It is used for gypsum block forming machine units, which can reduce the lost power energy and make equipments have high running efficiency. All hydraulic components adopt brand products, having long usage life.

2.3.7 Electric control cabinet

In order to make system have enough running time, we use international brand electric components; we use the PLC and transducer from Japan Mitsubishi products, use Schneider products as low-voltage electric components and the cabinet we use CHNT from China.

3. Main Equipments List

| No. | Name | unit | Qty. |
|----------|----------------------------|------|------|
| 1 | Production Workshop | | |
| 1.1 | Silo✘ | pc | 1 |
| 1.2 | Material level meter✘ | pc | 1 |
| 1.3 | Screw discharging valve✘ | pc | 1 |

| | | | |
|----------|---|-----|----|
| 1.4 | Flexible feeder✘ | pc | 1 |
| 1.5 | Screw conveyor✘ | pc | 1 |
| 1.6 | Weighing silo | pc | 1 |
| 1.7 | Pneumatic valve | pc | 1 |
| 1.8 | Metering water tank | pc | 1 |
| 1.9 | Electromagnetic valve | pc | 1 |
| 1.10 | Liquid level meter | pc | 1 |
| 1.11 | Pneumatic butterfly valve | pc | 1 |
| 1.12 | Flash screw conveyor | pc | 1 |
| 1.13 | Mixer | pc | 1 |
| 1.14 | Forming machine | pc | 1 |
| 1.15 | Space clamp | pc | 1 |
| 1.16 | Center hydraulic station | pc | 1 |
| 1.17 | Air compressor system | pc | 1 |
| 1.18 | Auto-control system | set | 1 |
| 2 | Lab✘ | | |
| 2.1 | Bending Tester | pc | 1 |
| 2.2 | Impact strength tester | pc | 1 |
| 2.3 | Steel plate ruler | pc | 4 |
| 2.4 | Vernier caliper | pc | 2 |
| 2.5 | Water content tester | pc | 1 |
| 2.6 | Wallpaper knife | pc | 10 |
| 2.7 | Blades | box | 5 |
| 2.8 | Loose weight unit tester | pc | 1 |
| 2.9 | Spray screen | pc | 1 |
| 2.10 | Density tester | pc | 1 |
| 2.11 | Plaster liquid mixer | pc | 1 |
| 2.12 | Electronic analysis scale | pc | 1 |
| 2.13 | Tester of standard density and setting time | pc | 2 |
| 2.14 | Box type resistance oven | pc | 1 |

| | | | |
|------|---|------|----|
| 2.15 | Digital display electric heating constant temperature drier | pc | 1 |
| 2.16 | Porcelain crucible | pc | 20 |
| 2.17 | Drier | pc | 2 |
| 2.18 | Table scale | pc | 1 |
| 2.19 | Beaker | pc | 6 |
| 2.20 | Beaker | pc | 2 |
| 2.21 | Acidometer | some | 1 |
| 2.22 | Cement strength test mould | pc | 2 |
| 2.23 | Bending tester | pc | 1 |
| 2.24 | Pressure tester | pc | 1 |
| 2.25 | Crucible holder | pc | 4 |
| 2.26 | scraping knife | pc | 2 |
| 2.27 | Tri-coupling test mould | pc | 2 |
| 2.28 | Mixing bowl | pc | 2 |
| 2.29 | Mixing pan | pc | 2 |
| 2.30 | Mixing rod | pc | 2 |
| 2.31 | Photoelectric scale | pc | 1 |

| № | наименование | тип | Комплект | кол | электро (kw) |
|---|--|------------------|----------|-----|--------------|
| | Силос для гипсового вяжущего (объем 60-80 м3) | 60m ³ | 座 | 1 | |
| 1 | Тросовый контроллер уровня материала в силосе | SG1008 | 件 | 2 | |
| 2 | Лопастной затвор | 300X300 | 件 | 1 | |
| 3 | Система автоматической подачи дисперсий (резерв) | D300 | 台 | 1 | 2.2 |
| 4 | Разгрузочный шнек | LS315 | 台 | 1 | 4 |
| 5 | Весовой бункер-дозатор с шнековым транспортером | SG0830 | 套 | 1 | |
| 6 | Система автоматической подачи воды | SG0830 | 台 | 1 | |
| 7 | Высоко скорость шнековым транспортером | PG1008 | 台 | 1 | 4 |

| | | | | | |
|----|---|----------|---|---|------|
| 8 | Смеситель | SG0830 | 台 | 1 | 4.4 |
| 9 | Формовочный ящик с рубанком (30 формовочных камеры) | SG0830 | 台 | 1 | |
| 10 | Укладчик | SG0830 | 台 | 1 | 4.4 |
| 11 | Центральная гидравлическая станция | SG0830 | 台 | 1 | 18.5 |
| 12 | Компрессор | TIGER-02 | 台 | 1 | 5.5 |
| 13 | Пневматический клапан | 300X300 | 台 | 1 | |
| 14 | Плоская задвижка | DN32 | 台 | 1 | |
| 15 | Плоская задвижка | DN50 | 台 | 1 | |
| 16 | Приставной фильтр | DN32 | 台 | 1 | |
| 17 | Ручной клапан | DN32 | 台 | 1 | |
| | | DN50 | 台 | 1 | |
| 18 | Металлоконструкции лестницы, стойки, площадки | | 套 | 1 | |
| 19 | Электро шкаф с проводкой | SG0830 | 套 | 1 | |
| 20 | Вставки для пустотелых плит | | | | |
| 21 | Система подачи смазочного масла | | | | |
| 22 | Гидравлическое основание для выталкивания плит | | | | |
| 23 | Обеспыливатель - пылеуловитель | | 套 | 1 | |

| Наименование | комплект) | Цена (Долл.) |
|---|------------|--------------|
| Gypsum Block Production Line Capacity: 300 000—400 000m ² /year Specification: 667mm (Length) × 500mm (Width) × 80mm | 1 | |

Срок изготовления полного комплекта оборудования 3 месяца.
Гарантия после подписания акта ввода в эксплуатацию – 1 год. После истечения гарантийного срока ,производитель обеспечивает после гарантийное обслуживание на протяжении всего жизненного цикла (По отдельному договору). Доставка два – 40 футовых и один 20-футовый контейнер