



Equipments and Procedure Description:

1. Load Measuring

Urban household waste is transported to waste processing plant by dedicated trucks and discharged to storing area after automatic weight calculation.

Household waste is sent to pre-separation processing system after weighted by motor truck scale. The pre-separation processing system mainly includes: plate-type feeding machine, bag-opening machine, manual sorting platform, drum screening machine, magnetic separator, air separator, belt conveyor and electrical control system.

2. Belt Conveyor

1) The driving system uses three-in-one hollow-shaft reducer motor produced by an international brand. This reducer motor uses a multiple-level deceleration system combined with vertical-axis bevel gear and high-precision hardened gear. It consists of engine, reducer and brake which are in a compact structure. It is very light, reliable and convenient for maintenance. The reducer connects with its body in a floating and flexible way so that it has good resistance to impact and small vibration.

2) The belt uses EP series which is resistant to oil and acid-base (low-temperature as an option). Its service life is far longer than ordinary conveyor belt.

3) The main shaft uses hardened and tempered No.20 steel. The entire drum is free of stress after welded. Adopted a holistic processing technique, the drum is with even wall thickness and good dynamic and static balance. It uses diamond cold adhesive which is resistant to oil and acid-base. It rotates in a transmission way as that of radial ball bearing. Its exterior also uses diamond cold adhesive which is resistant to oil, acid-base, abrasion and fire. Moreover, it has large friction and transmission torque, and prevents itself from skidding.

4) The head bearing uses UCP series of radial ball bearing with high precision, small rotary resistance force and long service life. The tail uses UCT spiral taut bearing with large tension which makes it convenient to adjust and maintain.

5) Cleaner: its head uses resilient rubber and hard alloy cleaner and its tail uses special triangle cleaner with scraper blade of drum which brings no abrasion to belt. It is efficient and can also protect the belt.

6) The upper roller is in a trough type which serves to support conveyor belt and materials on the belt. Benefit from the professional design of trough angle, the conveyor belt suffers small loss in the friction and even force during its operation. The roller consists of cold pressing bearing pedestal, special steel tube for roller, large clearance bearing for mining. It is well welded and encounters small resistance force during its operation. Its service life is relatively long.

7) Feed channel and feed-holding board are used to prevent leakage. Different from traditional device, two sides of the bearing area of the conveyor use high feed channel and is added a sealpad. Its tail uses galvanized feed-holding board which prevents leakage during the transmission.

8) The roller bracket of the body part in the middle is welded by cold-pressing trough steel and





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flat steel. Therefore, it has high strength and stiffness. The intermediate frame of the conveyor uses lock-bolt pressing board so that it is convenient to install and adjust. The intermediate frame is made of trough steel which meets the national standard so that it has high strength and stiffness which is higher than domestic ordinary conveyor.

9) All the rotary parts of the conveyor uses security net made of steel plate which meets the European latest security standards and fully shows the people-oriented design. The landing leg is fastened to the ground with chemical anchor bolts so that it is unnecessary to leave foundation for second depositing.

- Type: PL, U
- Configuration: there are different bandwidth according to technological requirement such as 800mm,1000mm,1200mm,1400mm.
- Angle: 0~21°according to technological requirement.
- Length: It is according to technological requirement.
- The selection of rubber belt, rack, drive device, tension adjuster, carrier roller, sweeper, supporting equipment and other fasteners is according to technological requirement.
- Supporting equipment includes discharging funnel and emergency stopping device and so on.
- The external part of drive roller uses diamond-type cold mucilage glue which retards inflaming and is with high wear-resistance, oil-resistance, and acid-resistance. It is also with great friction and large transmission torsion, which prevents from slipping.
- The upper branch of load-bearing of conveyer adopts high feeding channel and adds a sealing plate between belts while its lower branch uses blocking plate to prevent materials from spill.
- Surface antiseptic processing adopts technology of shotpeening. Before shotpeening, welding slag and splashing oil should be cleared.
- The surface of equipment should be painted with two layers of base coat and top coat.
- Electrical control part is connected with centralized control part, which can control and operate the equipment from the remote area. Each conveyor has been installed an emergency stop button. Meanwhile, manual sorting conveyor also has been installed speed-adjusting pullswitch and emergency stop pullswitch. Workers can reduce the speed or stop the equipment in a short time when necessary. In case of any emergency, they can stop the equipment to ensure the safety of equipment and people.

3. Bag-opening Drum Screen Machine

Household waste is sent into Drum screening machine after processed by manual sorting platform. Through drum screening machine materials can be divided into oversize and sifrage.





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Structure specification of roller screening machine:

1)The driving system uses flexible driving unit and is in the structure of four drum sleeve. The roller is made of 16Mn steel plate. Its rotating part is processed with fine machining and with thick wall which meets the requirement of service performance. The roller rotates with balance in the same direction as material-guide tablet and avoids friction with other parts. Make sure the axiality and cylindricity of spine of rotating part and the roller. After debugging, ensure that the rotating part rotates in a stable way without too much noise and its transmission speed is constant. Make sure that its gears, feeding and discharging devices work smoothly without leak of materials as well as they are firmly connected with well-distributed gaps.

2) Rolling loop is firmly welded with the roller which eliminating the stress.

3) Its framework is welded with whole structural steel, while sieve net is connected to the framework with bolts. Therefore, they have the advantages of long service life and stiff. The shape and bore diameter can be made according to the technological requirement.

4) Shaft block does not leak oil. Meanwhile, the temperature rise of shaft and speed reducer does not exceed 30°C.

5) Floating flexible drive system uses “three-in-one” hollow speed reducing motor produced by SEW, SIEMENS or Nord company. This kind of speed reducer adopts multilevel speed reducing system with vertical axial bevel gears and high-precision hard gears. Combined with motor, speed reducer and brake, it is compact in structure, light in weight, easy to assemble, and with reliable performance, high precision and long service life.

6) The drum is made of 16Mn steel plat and its rotary part is thick and mechanically finishing which makes its wall satisfy the performing needs. The drum rotates with the direction of feeding plate in a balanced way which prevents it from running into other parts and ensure the coaxiality and cylindricity of spiral keel and drum. After debugging it should meet the requirements: the rotating body rotates in a steady speed and makes low noise. Gears are well engaged and feeding device functions well without leakage. It is firmly connected and with even gaps.

7)The sieve plate is made of good-quality steel plate with a thickness of 10mm. Its aperture can be adjusted according to different needs. It is convenient to dismantle it and it is also resistant to acid-base and corrosion after intensified by antiseptic process.

8)Bag-breaking blade: there are no less that 24 sets of blade which are distributed evenly and in double helix way inside the sieve drum. It can break the bag while sorting materials out.

9)The center of bearing wheel is made of high-intension steel and covered by composite materials which are resistant to abrasion, pressure and acid-base. The bearing roller is firmly fastened and resistant to abrasion and corrosion. The driving unit is a three-in-one system with reducer, motor and brake which has large friction force and good resistance to impact. Its service life is also relatively long. The rolling hoop is firmly welded with the rotary drum. It is free of stress after welded. When the roller body rotates without carring materials, the rolling hoop seldom slides and the contact area between rolling wheel and rolling hoop is larger than 60%.

10)The framework is welded with structural steel. The sieve net and the framework of rotary drum is connected by bolts. They have long service life and good stiffness. The shape and aperture of sieve mesh can be determined by the demands of craft and be interchanged easily.





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4. Air Separator

Air separator sorts out papers, plastics, films and other light materials from sieve overflow and then these light materials are evenly sent from vibrating feeder to the infrared sorting equipment, through which PE, PET, PP can be sorted out. The remaining heavy materials will be sent into manual sorting platform.

The device uses the principle of aerodynamics to discard the light substances (plastics, papers etc.) from the substances on the drum screen; then, the light substances are conveyed to Material Separator; after that the Material Separator separates the selected substances from air; finally, the light substances directly drops on the next Light Substance Feeding Machine.

The air volume and air pressure are adjustable; the installed adjustable air valve Ventilation pipeline is made by galvanized plate; the length and layout of the pipeline are decided according to the practical installation.

The main material of Material Separator is 16Mn; the Separator has a “jacket” made by galvanized iron sheet whose thickness is not less than 1.5mm.

- It consists of air blower, pipes, material separator, dust remover, repair stations and necessary fasteners
- Usage: it is used to sort out various light materials in screen overflow waste(oversize), which increases the efficiency of resource recycle.

5. Bag-opening Machine

Hydraulic step-feeding system evenly sends materials into the Z-plate conveyor and hoists to bag-opening machine. Since household waste is usually mixed together and collected by bags, bag-opening machine which mainly consists of bag-opening rotary roller, drive device and rack.

Advancement: At present, we often see many different sizes bagged garbage in the disposal of MSW. These bagged garbage can directly influence the sorting efficiency during the sorting processor, so that the valuable garbage cannot be discarded, and cannot be in conformity with the disposal requirement. Therefore, some workers will be employed to do bag-opening for bagged garbage in process, which makes workers work hardly. What’s more, when the process is large, only workers cannot do the work completely. There are also some bag-opening machines installed in the advanced processes, but there is a common problem that bag-opening rate cannot reach the ideal efficiency, easy to tangle, difficult to clean, and cannot have a uniform process capacity.

- After bag-packed waste is sent into storage, then it enters into bag-opening rotary roller whose bag-opening knives inside will lift bags upward to tear them with bag-opening knives.
- With a high efficiency in opening bag, it can effectively take waste out of bags.
- The rack is steel welded with high stiffness and impact resistance.

6. Plate Feeding Machine

This kind of plate-type conveyor is applicable to urban household waste separation system, which mainly processes heavy load and materials needed to be transported with large dip. It can





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process large volume of materials in a stable way. Meanwhile, with a compact structure, it is reasonably designed and convenient to maintain. It fully takes into account its service performance and safety for manual operation, which illustrates its design principle of “human-centered”. Adopting modularization design, different series are produced according to different processing volume requirements.

- (1) Adapting to the long working of feeding storing area, doing anti-corrosion process for the exposed parts of medium-sized Plate Feeding Machine.
- (2) Drive system is adopted AC speed stepless motor and electric protecting equipment, which has the characteristics of uniform speed regulation, automatic overloading protection, etc.
- (3) All are adopted roller bearing supporting structures, sealed and lubricated well, and have little moving resistance, conveniently maintained.
- (4) Guarantee the closure of overlapping of feed chutes, prevent spilling of materials effectively.
- (5) Trussed structural rack is light, rigid, small, and easy to regulate, install, disassemble and transport.
- (6) Speed can be regulated.
- (7) Guarantee gears and chains mesh smoothly, drive shaft roll smoothly; guarantee the chain wheel and lead rail are contacting and roll flexibly.
- (8) Guarantee butterfly shaped pieces can cooperate with each other well and closure well.

7. Magnetic Separator

- (1) Iron Remover has a steel structure with enough rigidity and intensity.
- (2) Suspension equipment is not safe and firm, but also conformity with the long using requirement.
- (3) The surface of Iron Remover is smooth and beautiful, and all weld joints are polished very smooth.
- (4) All the equipments have completed functions, advanced technology, and satisfy personnel safety and labor protection requirements.
- (5) All equipments are exactly designed and made, safely and continually operation under regular working condition; which do not appear the problems of excessive stress, vibration, temperature rise, wearing, aging etc. ,and other problems.
 - Suspended magnetic separator includes fixed magnet, transmission belt, fixed components and other fasteners and tools.
 - Drive device: it consists of motor, speed reducer, transmission roller, main wheel carrier and so on. The suspension structure, fixtures, etc. The strength and stiffness of its suspended structure and fixed devices can meet the requirements of service performance.

8. Full Automatic Hydraulic Packing Machine

The device is used for continues compressing and packaging of all kinds of plastics, films, papers and other light materials, which drastically decreases this kind garbage’s occupation area; supplies conveniences for the following process and transferring; and reduce transporting cost





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effectively.

The continuous Hydraulic Packaging Machine produced by our company has advantages of easily installing and maintaining; sample and clear controlling interface; powerful continuous process ability.

9. Manual sorting platform

Standing along the two sides of sorting conveyor, workers sort out glass, net ropes, chunk woods, bricks, stones, ceramics and other interferences from materials processed after magnetic separator. These interferences are then sent to dustbins under sorting platform through funnels and then buried or for other purposes.

- It is equipped with light, glass windows, doors opened from the outside, air-conditioners, which creates a comfortable and bright working conditions for the sorting staff.
- Walls are made of polystyrene composite board of 100mm thickness, whose subject is steel frame.

10. Discharging station

There are about 20% waste needed to be buried after separation processing. Therefore, reversible discharging station can be set according to clients' demands, which plays a very important role in the transmission of waste needed to be buried.

- Set repair and maintenance platform and ladders according to the specific on-site conditions.
- Waste is evenly sent from upstairs feeding conveyor to two downstairs mobile and reversible conveyors. Then it is packed into containers which is convenient for transmission.
- Once one of containers is full, the system will automatically switch to another mobile and reversible conveyor.

11. Stirring-thrower

After pre-separation processing system, materials can be fully stirred and mixed by stirring-thrower and turn into compost.

It is with high efficiency and compact structure, which is applicable to triangle accretion processing.

12. Star-shaped sieve

With high efficiency, the star-shaped sieve is used to sort out urban waste compost such as constructional waste, industrial waste, glasses, sandy mud, lime-ash, papers and paperboard.





13. Electrical control system

The whole system consists of PC, PLC, on-site equipment, and uses industrial Ethernet and PROFIBUS DP to connect the above three parts into a control network. It aims to cover the whole production line to the maximum degree through video surveillance and host computer surveillance and to meet the requirements of waste processing management and automatic control. The system uses modern computer and industrial control equipment to achieve the informanization of production factors in waste processing such as automatic monitoring, management, and maintenance.

Automatic control system controls the on-site equipment according to various signals collected by PLC and its own procedures. Meanwhile, it uploads various states of on-site equipment to the host computer through the network. In the host computer through the control interface signals can be illustrated by graphs with different colors and shapes. On the other hand, it can send operator's order to the sorting line PLC and control the corresponding device to perform the relevant actions.

14. Storage Zymolysis

Storage Zymolysis System is mainly composed of seven systems: Ceiling material-distributing system, mobile vehicle feeding system, mobile material-distributing system, discharging system, ventilation system, control system of fermentation parameters, and deodorization system.

①Ceiling material-distributing system

After household garbage has been pre-sorted, those corrodible organic matter which are suitable to be composted will be sent to the ceiling material-distributing system of fermentation compartment in the composting plant. This fabric system consists of two parts: on the top there is a fixed belt conveyor, while on the bottom a reversible mobile belt conveyor. Materials will be transferred from the former to the latter so that they will finally be sent into the mobile material-distributing system in the fermentation compartment.

②Mobile vehicle feeding system

Through mobile vehicle feeding system, mobile material-distributing machine will be sent into the fermentation compartment to hold materials from the top reversible material-distributing machine.

③Mobile material-distributing system

Through mobile material-distributing system organic matter are distributed evenly in the fermentation tunnel which is completely closed throughout the fermentation process.

④Control system

The fermentation tunnel is equipped with control system of temperature, humidity and oxygen, which can automatically adjust the fermentation parameters inside the fermentation compartment and create favorable conditions for the microbial activity of each phase and the decomposition of garbage within 2 weeks.

⑤Discharging system

In the fermentation compartment use loader to discharge materials.





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⑥ **Ventilation system, exhaust gas and waste water treatment system**

Fermentation compartment has ventilation and aeration system which provide adequate oxygen for the inside micro-organisms. Exhaust gas produced during the fermentation can be discharged after processed by the deodorization system which uses bio-filter system or tower deodorizing system. Waste water generated in the fermentation process can be reused in the composting process as compensation.

