



APEXIND INNOVATIVE INDUSTRY LLP

FOUNDRY RETURN SAND PREPARATION PLANT

**BUILT RIGHT. BUILT TO LAST. ENGINEERING
YOU CAN RELY ON..!**



**DESIGN | MANUFACTURING & FABRICATION | SUPPLY | INSTALLATION & COMMISSIONING
| ELECTRICAL, INSTRUMENTATION, CONTROL & AUTOMATION INTEGRATION.**



**ENGINEERED SOLUTIONS COVERING RETURN
SAND COLLECTION, SCREENING, COOLING,
STORAGE, ADDITIVE HANDLING, BATCHING,
CONVEYING AND DELIVERY TO MOULDING LINES,
EXECUTED UNDER SINGLE-POINT
RESPONSIBILITY.**

- **Single-point responsibility.**
- **Honest engineering.**
- **Continuous-duty design.**

INTRODUCTION TO RETURN SAND PREPARATION PLANTS

The return sand preparation plant forms one of the most critical support systems in a foundry. After mould shakeout, the used sand must be collected, screened, cooled, stored, conditioned, and returned to the moulding system in a controlled manner. The plant directly affects mould quality, casting consistency, production continuity, dust levels, and overall foundry efficiency.

Return sand carries residual heat, broken lumps, fines, metallic particles, dead clay, moisture variation, and contamination from the casting process. If this sand is not properly processed before reuse, it can lead to poor mould strength, gas defects, dimensional variation, excessive binder consumption, high dust generation, and frequent breakdowns in the sand handling line.

A properly designed return sand preparation plant must therefore fulfil four fundamental requirements: reliable handling of hot and abrasive sand, efficient removal of lumps and contamination, controlled storage and flow of return sand, and consistent conditioning through accurate addition of water, bentonite, coal dust or other additives as per the foundry recipe.

TYPICAL MATERIALS HANDLED

The typical materials handled in a foundry return sand preparation plant include return sand from shakeout, new sand, reclaimed sand, bentonite, coal dust or sea coal, water, fine dust, additives, return fines, metallic particles, lumps, and waste sand. Depending on the foundry process, the system may also handle facing sand, backing sand, core sand rejects, and sand recovered from dust extraction systems.

PROCESS OVERVIEW

Return sand from the shakeout area is collected through belt conveyors, vibrating conveyors, or collection hoppers. The sand is transferred through screens to remove lumps, tramp metal, and oversize particles. Magnetic separators may be provided to remove ferrous contamination before the sand is elevated to storage bins or silos.

The hot return sand is routed through a sand cooler or conditioning arrangement where temperature and moisture are controlled. From the storage bin, the sand is extracted through feeders and conveyed to the sand preparation section. New sand, bentonite, coal dust, water, and other additives are introduced in controlled proportions as per the moulding sand requirement.

The prepared sand is then delivered to the moulding machine hopper, day bin, or sand distribution conveyor. The actual plant configuration depends on moulding line capacity, sand-to-metal ratio, type of castings, green sand system design, available space, and level of automation required by the foundry.



EQUIPMENT SUPPLIED FOR SAND PREPARATION PLANTS

The complete range of MHE required for sand collection, transfer, storage, additive handling, & prepared sand distribution can be designed, manufactured, supplied, installed, & commissioned by us. The principal equipment categories supplied for sand preparation plants are outlined below.

- ❑ **Belt Conveyors:** Used for collection and transfer of return sand, new sand, prepared sand, and waste sand. Conveyors are designed for dusty, abrasive, and continuous-duty foundry conditions. Depending on the application, flat, troughed, short-pitch, pit-mounted, inclined, or covered conveyors can be supplied. Special attention is given to skirt sealing, dust control, belt protection, pulley selection, take-up arrangement, and maintainability.
- ❑ **Belt/ Screw Feeders:** Provided below hoppers, bins, and storage silos for controlled extraction of sand. Feeders are designed for reliable discharge of abrasive material and can be VFD-controlled for adjustable flow rates.
- ❑ **Bucket Elevators:** Used for vertical lifting of return sand, new sand, cooled sand, and prepared sand. Belt or chain type construction is selected based on temperature, duty, capacity, and material condition. Elevators are supplied with casing, boot section, head section, buckets, drive arrangement, inspection doors, access platforms, and safety devices.
- ❑ **Rotary Screens:** Provided for removal of lumps, oversize particles, core pieces, and foreign matter from return sand. Screens are selected based on sand temperature, capacity, lump size, screening efficiency, and maintenance access. Screening equipment helps improve sand consistency and protects downstream equipment from blockage and damage.
- ❑ **Storage Silos, Hoppers and Bins:** Engineered for return sand, new sand, prepared sand, bentonite, coal dust, and additive storage. The design considers bulk density, angle of repose, flowability, moisture content, dusting tendency, and discharge reliability. Bins can be supplied with inspection openings, level switches, access ladders, platforms, discharge gates, & feeders.
- ❑ **Pneumatic Conveying Systems:** Used mainly for fine additives such as bentonite, coal dust, fine dust, and other powder materials. Dense phase pneumatic conveying systems allow enclosed, dust-free transfer from bags, silos, or storage bins to additive dosing points.
- ❑ **Weighing and Batching Systems:** Load-cell based weighing hoppers, batching hoppers, and weigh feeders can be integrated for controlled addition of new sand, return sand, bentonite, coal dust, water, and other additives. The batching system helps maintain consistent sand properties and reduces dependency on manual judgment.
- ❑ **Technological Structures and Plant Building Steel:** Equipment support structures, conveyor galleries, walkways, platforms, ladders, access systems, maintenance decks, and transfer tower structures can be supplied as part of the integrated plant package. These are designed considering equipment loads, maintenance access, safety, and ease of erection.
- ❑ **Dust Collector System/ Bag Filter with Reverse Pulse Jet Cleaning:** Designed for collection & control of process dust generated during material handling and transfer operations. The system includes dust extraction ducting, bag filter housing, filter bags, compressed air pulse cleaning arrangement, hopper, rotary airlock valve, exhaust fan, dampers, access doors, and control panel as required.



THE APEXIND TURNKEY SCOPE

Apexind undertakes foundry return sand preparation plant projects on a single-point responsibility basis. Clients engage with one engineering and execution team for the complete sand handling and preparation system, reducing the difficulty of coordinating multiple vendors.

- ❑ **Concept and Detailed Engineering:** Each project begins with understanding the foundry layout, moulding line capacity, shakeout arrangement, sand-to-metal ratio, sand temperature, additive recipe, space availability, and production requirement. Apexind develops process flow diagrams, equipment sizing, plant layout, conveyor routing, structural design, control philosophy, and installation planning. Both greenfield and brownfield foundry projects can be addressed.
- ❑ **Manufacturing and Fabrication:** Material handling equipment, hoppers, bins, conveyors, feeders, elevators, chutes, gates, support structures, platforms, and allied fabricated items are manufactured and fabricated as per project requirements. Designs are developed for rugged foundry conditions, abrasive service, ease of maintenance, and continuous operation.
- ❑ **Supply, Installation and Commissioning:** Apexind can execute site installation including equipment erection, alignment, structural assembly, conveyor installation, trial runs, no-load trials, load trials, and commissioning support up to production handover.
- ❑ **Electrical, Instrumentation, Control and Automation:** Apexind can integrate the electrical and automation package including motor control panels, VFDs, field sensors, level switches, weighing systems, load cells, weigh controllers, PLC, HMI, SCADA, recipe management, interlocks, alarms, sequence control, and production reporting. The level of automation may be manual, semi-automatic, or fully automatic based on client requirement.
- ❑ **Equipment Outside Our Manufacturing Scope:** Certain foundry-specific equipment such as sand mixers, sand coolers, shot blasting machines, moulding machines, dust collection bag filters, PLC hardware, drives, weighing electronics, and proprietary instruments may fall outside our direct manufacturing range. These items can be procured from established sub-vendors and integrated into the overall system, or supplied by the client on a free-issue basis. Apexind can remain responsible for mechanical integration, installation coordination, and system-level execution.

WHY APEXIND

More than 2 decades of hands-on engineering experience • Practical understanding of foundry sand handling problems • In-house design and fabrication capability • Strong vendor network for bought-out equipment • Honest project timelines • Honest costing • Single-point accountability • Fit-for-purpose engineering for Indian foundry conditions.



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