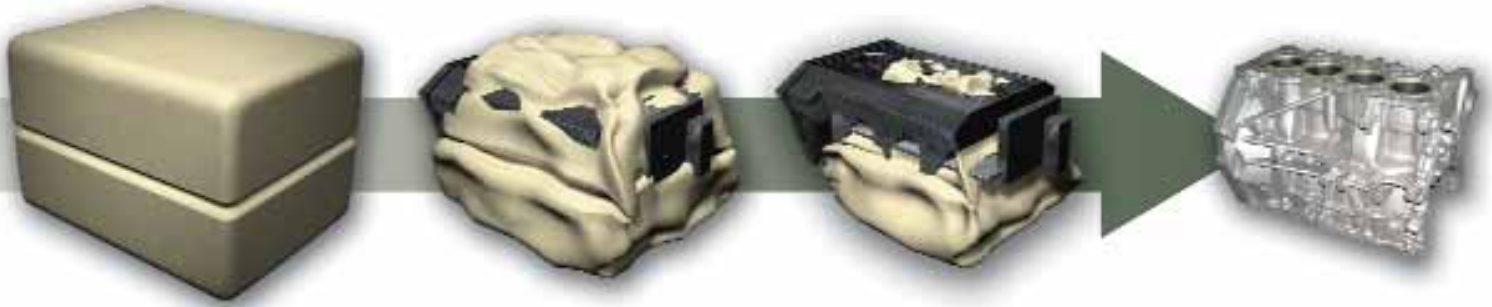




Consolidated Engineering Company
Quality Heat Processing Equipment



Sand Lion[®] 
3-in-1 Foundry System



1 Removal of Mold and Cores

Sand Lion® strips sand from castings using only heat and oxygen, not shakeout or vibration. Heated, high-velocity air volatilizes the resins that bind the sand, while special fluidizers remove ash and residuals that remain on the silica grains. High air speed causes pressure drops, leading to turbulence inside and outside the casting that removes loose sand. The casting emerges heat treated, clean, undamaged and ready for machining.

2 Thermal Sand Reclamation

Sand Lion® doesn't just clean the casting - it reclaims sand too. Heat and oxygen burn away binder agents, and loose core sand falls into a fluidized bed in the furnace's hopper-shaped bottom. Fluidization and friction remove binder residue and ash from the silica grains, and the low - LOI sand is returned via a pneumatic conveyor and cooler to the core shop - ready for another round without further treatment.



3 Heat Processing of Castings

Sand Lion® is a heat-treat furnace too - but not like any other. Castings enter the machine in close proximity to pouring, so they heat up to solution temperature in a short cycle; high velocity air permits close temperature tolerances. Heat treatment takes place while the core removal process is completed - there is no need for hours of storage, or for cooling and reheating. Sand Lion® also recycles energy from the melting and binder burning, and uses it for heat treatment.



Lower Production Costs

Compared with stand alone equipment, a Sand Lion® system lowers energy consumption, recycles sand, saves labor, reduces material handling and requires less floor space.

Higher Quality

Precise controls on time and temperature produce castings with consistent physical properties. Sand Lion® uses hot, high-velocity, turbulent air to remove sand without knockout damage.

System Recycling

The 3-in-1 process cleans sand completely, so it can be used again in the core shop. It also recycles energy - more than 40 percent in some systems.

Worldwide Reliability

Currently, more than 52 Sand Lion® systems operate worldwide, with a capacity of twenty million engine block and cylinder head castings per year.

Protection of the Environment

A Sand Lion® system cleans itself - leaving all materials and out-gases environmentally safe. Your foundry can be part of the solution, not the problem.

Customer Service

CEC engineers begin with your unique foundry challenges. We'll design a cost-effective solution, install it and follow up with support whenever you need it. We can even manage your post-casting operations ourselves, if you choose.



In total, more than 52 Sand Lions have been sold or are on order for foundries in America, Europe and Asia in order to treat aluminum castings such as, engine blocks, cylinder heads and manifolds. CEC is the only common contractor for treating precision sand molds in the world. All of the foundries with precision sand molds, have installed 3-in-1 systems directly after pouring. Castings from low pressure or gravity die casting machines are picked up for treatment directly after the machines. These lines are also the largest thermal sand reclamation facilities worldwide and reclaim between 5 and 30 tons of sand per hour.



3a. Fully automated Sand Lion roller hearth system T-6 heat treats and age hardens over 4,000 kg/hour of aluminum engine blocks. The system replaced an older multi-step process and paid for itself in 18 months with demonstrated energy savings, reduced floor space, environmental controls and sand reclamation.



3b. 3-in-1 continuous U-shape T-6 solution heat treatment system with air quench and water quench systems. It also reclaims 15 tons/hour of silica sand to a controlled L.O.I. of less than 0.08%.



4a. Continuous Sand Lion® roller hearth system installed in Germany. This system has the capacity to heat treat 6 to 8 engine block castings on a tray, up to 160 castings per hour.



4b. Closed loop, fully automated Sand Lion® system designed for processing of up to 90 I-4 engine block castings per hour. The system includes robotic loading of castings, water mist air quench and 26 tons per hour sand reclamation capacity.



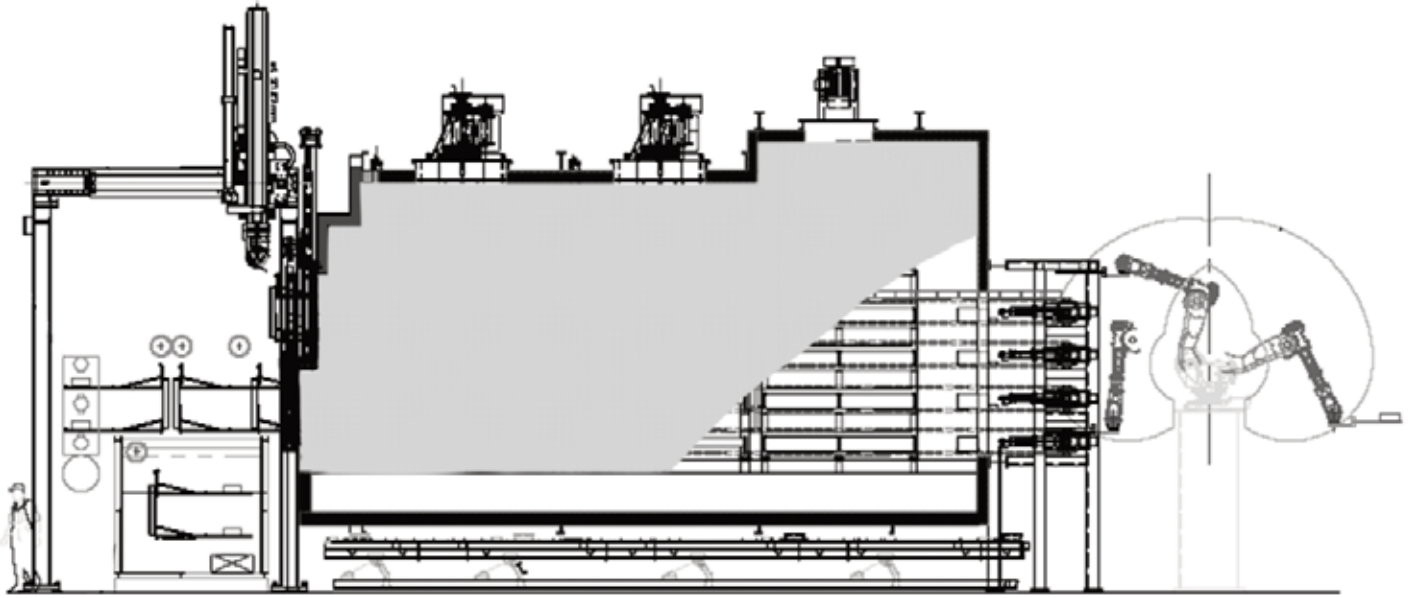
4c. 3-in-1 continuous U-shaped T-6 solution heat treatment system with both air and water quench capabilities.



4d. Dual level roller hearth Sand Lion® systems for engine blocks T-6 heat treatment.

CleanCast® - Solution Heat Treatment

CleanCast®, a revolutionary new heat treating process from CEC, utilizes high pressure, heated air to rapidly heat and thermally de-core castings. This process, in combination with a patented new procedure that allows castings to be loaded into the furnace directly after mold filling, results in a substantial operational cost savings. The CleanCast® system's compact design allows it to be easily installed adjacent to existing casting equipment, providing for a complete close proximity cell system.



Customer Cost Reductions

- Shorter Heat Treatment Cycle
- Energy Reduction of Over 60%
- 75% Smaller Footprint
- Supports Increased Casting Complexity
- Labor Savings in Excess of 80%
- Complete Sand De-Coring & Reclamation
- 40% Maintenance Savings

CEC Research & Development

Sand Lion® systems are engineered and manufactured in a world-class, state-of-the-art, UL listed facility. With a deep knowledge in all related technologies, we are able to bring the perfect solution to every foundry project. No other system designer has the capability to analyze your special requirements and provide a more cost-effective result for your casting line requirements. CEC is staffed with a well experienced team of mechanical, electrical, thermal and metallurgical engineers. Our experience in all types of heat processing equipment, systems and industries, uniquely qualifies us to meet your foundry system requirements. CEC's in-house testing capabilities include mold filling and a full size testing system for engine blocks, cylinder heads or other cored castings, with both air and water quenching. CEC also offers a unique mobile furnace system for testing directly at the customer's site.





Deep Fluid Beds

For smaller operations, castings that require variable processing times and temperatures or for difficult core removal, CEC's DFB system may be the answer. It provides the complete Sand Lion® 3-in-1 technology for less than the price of a stand alone sand reclamation system. For larger systems, a DFB can be used in combination with a roller hearth furnace (a combi system).

In a Sand Lion® Deep Fluidized Bed, pre-heated air circulates through a bed of foundry sand, providing enough lift to hold it in suspension. Castings with cores intact are lowered into the fluidized bed and sand circulates around and through them to provide efficient, even heat transfer and core removal.



CEC Thermal Products, Ovens & Furnaces Group

The cornerstone of CEC is our comprehensive background in heat processing systems and equipment. Complete lines of drop-bottom and continuous T-6 roller hearth systems are available for many casting processes. CEC ovens and furnaces can be configured for batch and continuous turnkey operation, as stand-alone systems, or add-on modules to existing processing lines.

CEC AfterMarket Sales & Service

CEC's AfterMarket Sales & Service department is committed to customer service. CEC has the capabilities in place to service all your heat treating equipment needs. The CEC AfterMarket Sales & Service department has the experience and the resources to evaluate the operation of your equipment and recommend the system update to keep your operation as productive and cost efficient as possible. Consult face-to-face with CEC and receive innovative solutions on how to keep your equipment running at peak efficiency. Significant advances have been made in process control, material handling and data acquisition.



CEC Contract Service

While you concentrate on your casting and machining operations, CEC's experts can handle your sand removal, sand reclamation and heat treatment processes - taking full responsibility for post-casting production. We'll install, manage, operate and maintain a Sand Lion® 3-in-1 system. You pay a negotiated price for each casting, based on detailed, verifiable production data. That way, you can turn fixed costs into variable costs - avoiding capital investment and costs for equipment maintenance, personnel, spare parts and even post-casting utilities. You get the flexibility of reducing costs during periods of low demand.

CEC Contract Services offer long-term contracts with fixed per-piece pricing.

Engineering and Innovating Since 1959

Consolidated Engineering Company has engineered foundry and heat processing technology since 1959, with more than 100 patents granted or pending, and recognition as a world leader in both fields. CEC's design, production and distribution operations have been certified to the ISO 9001 International Quality System Standard. Our equipment has always encompassed the very latest in heat processing technology to help our customers compete more effectively and efficiently. To date, CEC has over 3,400 installations worldwide serving the automotive, aluminum, aerospace, chemical, copper, foundry, metalworking and various other industries.

We have a comprehensive background in heat processing technologies, CEC can meet any heat processing challenge. Every project is directed by a project manager, who leads a team of foundry, electrical, thermal, mechanical and metallurgical engineers. These teams bring together comprehensive expertise in all related heat processing technologies and are supported by the latest design systems. Our field teams provide complete installation, training, testing and start-up services. We custom fit all our solutions to our customers needs, helping them perform competitively and economically.

Customers Served

Aluminum

Alcan Aluminum
ALCOA
Alumax Aluminum
Cressona Aluminum
Kaiser Aluminum
Southwire

Automotive

BMW
Ford Motor Co
General Motors
Honda Motor Co
Mazda
Mercedes-Benz
Suzuki

Foundry

Caterpillar Ind.
Citation Corp.
Cosworth
Daihatsu
Hayes-Lemmerz
Nemak
Phillips
Reliable
Shenyang Aerospace
Superior Industries
UBE



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