

CASTING ONLINE MAGAZINE

C.O.M.

Fill

500
SWINGMASTER

Dry Ice Blasting In Foundries

Modernizing Vacuum Impregnation Equipment

**Printed Castings:
Optimized housing lets E-Motorcycle Batteries live longer**

Metal chips are (added) value

Dear readers,

In this issue you can expect articles on mold and tool cleaning, on choosing the right impregnation process, on developments in the field of briquetting of metal chips and on the production of prototypes using 3D printing.

As in various industrial sectors, mold and tool cleaning is also of great importance in the various foundries. In particular, the optimal cleaning of the molds and core boxes is becoming increasingly important, as this not only increases quality, but also optimizes productivity and costs.

Choosing the right impregnation process and the right impregnation agent is crucial for purchasing impregnation equipment. The redesign of vacuum impregnation systems has also improved recovery rates and cycle times. Automated impregnation technology has also led to the development of compact, manually operated systems.

A decentralized briquetting solution opens up new potential for savings in metalworking. The metal press is simply pushed to the cutting machining center, quickly connected and the user benefits from all the advantages of briquetting including the directly returned cooling emulsion.

In a student focus project at ETH Zurich, prototypes of a new type of cooling system for electric motorcycles are being implemented with the support of voxeljet. A new type of cooling system in the "ethec city" electric motorcycle ensures a longer service life for the battery cells. In order to familiarize students with manufacturing processes that can be used for series production apart from prototype construction, the mold for the innovative battery housing of the prototype is made using the binder jetting process.



I wish you lots of new insights while reading and look forward to your opinion and suggestions for the next issues of Casting Online Magazine.

Dr. mont. Stephan Hasse

Foundry Technologies & Engineering GmbH
 Publisher of www.giessereiexikon.com



Source: Fill

Our cover picture

As the world leader in decoring technology for aluminum as well as iron and steel casting, Fill's expertise in this field is extensive. Fill decoring machines and hammers are THE recognized industry standard for the most demanding requirements and the toughest decoring tasks. They unite maximum performance, payloads and flexibility – worldwide.

The picture shows the SWINGMASTER 500, a decoring machine for the automated decoring of heavy and large castings of up to 500 kg total weight.

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IMPRESSUM

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Dry Ice Blasting In Foundries - Mold And Tool Cleaning Without Stopping Production

Fabian Weber

Like in many industries, also in foundries the cleaning of molds and tools is of utmost importance. Particularly efficient cleaning of chills and core boxes becomes increasingly more important because it increases not only the quality but also productivity and costs can be optimized (Fig. 1 and 2).

ASCO has successfully developed an innovative cleaning process, which is perfectly suited for the foundry industry. The ASCO dry ice blasting technology offers the following advantages:

- **Gentle:**

Molds and tools are not damaged; the product quality is improved.

- **No dismantling of molds and tools:**

Expensive shut-down time is reduced to a minimum. Even hot molds can be cleaned on-line without being cooled down remarkably.

- **No secondary waste:**

The blasting material, dry ice, turns to gas as soon as it hits the surface. Thus, there is no blasting media or chemical substances to be disposed of. Work conditions are improved because dry ice blasting does not charge the staff with additional dust contrary to sand or granular blasting.

- **Dry:**

No danger of corrosion and no electrical components are damaged.

- **Environmentally friendly:**

No secondary waste, no solvents or other chemical substances.



Fig.1: Online cleaning of a hot mold



Fig.2: Core box cleaning in a grey cast iron foundry

How can this cleaning method be used?

The ASCO Dry Ice Blasting System offers the option of cleaning dismantled molds in cabins or to perform the cleaning operation directly on the mounted hot molds. Many gravity die casting foundries use the second option to avoid expensive production stops, and to reach higher quality thanks to more frequent cleaning. The molds are not damaged, because the blasting abrasives is virtually non-abrasive (Fig. 3 and 4).



“The ASCO Dry Ice Blasting System offers the option of cleaning dismantled molds in cabins or to perform the cleaning operation directly on the mounted hot molds”

In practice, cleaning is nowadays done more often to completely avoid aluminum residues on the mold's surface. For instance, manufacturers of high quality aluminum rims clean the molds at every shift change using dry ice blasting. The cleaning process can be carried out directly on the mold (which has a temperature of up to 350 °C) without noticeably reducing the temperature of the mold. After 20 to 30 minutes, production can be restarted (Fig. 5 and 6).

With traditional blasting using sand or glass beads, the cleaning process is delayed for as long as possible, which often leads to aluminum residue on the mold's surface. The time required for the removal of the molds and the subsequent cleaning then amounts to several hours.



Fig.3: Online cleaning of a hot mold



Fig. 4: With the ASCO Dry Ice Blasting Technology production downtimes are avoided.



Fig. 5: Cleaning of a core box in the automotive industry



Fig. 6: Cleaning of built-in hot molds

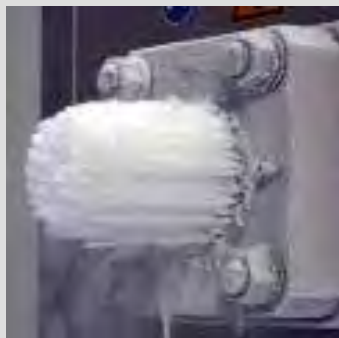
Also, the cleaning of the core boxes (Cold-box and Hot-box) is easier and faster with the ASCO Dry Ice Blasting System (Fig. 7).

The usual cleaning time of several hours is reduced to a few minutes. Particularly because abrasive blasting material cannot be used with Cold-box molds (plastic), dry ice blasting is ideal for this purpose.

The Process

Dry ice is produced from liquid CO₂. Inside an ASCO Dry Ice Pelletizer, the liquid carbon dioxide is expanded under controlled conditions to form dry ice snow (approx. -79 °C), which then is pressed through an extruder plate. The result is dry ice pellets with a diameter of 3 or 1.7 mm.

The dry ice pellets are fed into the ASCO Dry Ice Blasting Unit, then conveyed to the blasting gun via compressed air to reach a nominal speed of approx. 300 m/s before shot onto the surface to be cleaned. Due to the sudden thermo shock when the dry ice hits the object and the generated kinetic energy the coating to be removed comes off the base material. Immediately after impact, the dry ice pellets sublime into the atmosphere leaving behind a clean, dry surface. The only thing left behind is the coating/dirt removed from the surface and no residual blasting media has to be disposed of. Since the hardness of the pellets is only approx. 2 Mohs, the cleaning is virtually non-abrasive and the surface quality is maintained. Also, the thermoshock has no influence on the surface quality of molds and tools.



“The usual cleaning time of several hours is reduced to a few minutes”



Fig. 7: Removal of release agent from a PU core box

The Complete Solution

As leading provider of complete dry ice blasting solutions, ASCO's aim is to find tailor-made solutions for individual customer requirements (Fig. 8). The extensive ASCO product and service range consists of:

- Dry ice blasting units
- Dry ice pelletizers
- Dry ice containers
- CO₂ gas detectors
- Manifold accessories
- Specially developed guns or nozzles
- Blasting cabins
- Automated cleaning solutions
- Building up your in-house dry ice production



Fig. 8: Dry ice blasting solutions

ASCO not only introduces you to the ASCO dry ice blasting technology but also helps with integrating dry ice cleaning into the production process and continually optimizing it.

In case of an increased demand for dry ice, we will be pleased to offer you an economical calculation for your in-house dry ice production to optimize on cost and quality (**Fig. 9**). Our product range contains dry ice pelletizers with production capacities from 30 to 750 kg/hr.

Establish your own dry ice production

Your own dry ice production (**Fig. 10**) already pays off with a demand of a few 100 kilos per week. ASCO therefore also offers interesting overall concepts with the ASCO Carefree Rental Solution, where you do not have to make any investments.

Advantages of your own dry ice production:

- Reduced logistical effort associated with dry ice purchasing and scheduling
- Less dry ice loss due to sublimation
- More flexibility, as freshly produced dry ice is always available
- More efficient cleaning results, because: the fresher the dry ice, the more efficient the cleaning
- Lower dry ice consumption
- Shorter production downtimes



“Your own dry ice production already pays off with a demand of a few 100 kilos per week”

ASCO Carefree Rental Solution:

To facilitate the step of an own dry ice production, ASCO now offers „ASCO Carefree“. True to the credo „You produce, We invest“, ASCO provides flexible dry ice production capacities on a rental basis with full service and maintenance (**Fig. 11**).



Trockeneis-Pelletizer P15i
Produktionskapazität 150 kg/Std
für 3 mm Pellets



Trockeneis-Container AT240
Pellet Kapazität ca. 240 kg
Leergewicht ca. 54 kg

Fig. 9: Dry ice pelletizer with container



Fig. 10: Dry ice production

When renting, you can choose between a calculable fixed price or a „pay per use“ option. ASCO makes the decision easy, and customers can produce without any worries. Thanks to the latest i-Series technology (**Fig. 12**), ASCO networks the machines and offers up-to-date, modern and customized solutions for dry ice production!



Fig. 11: „ASCO Carefree“



Fig. 12: Dry ice pelletizer i-series

Profit from our experience

We have developed steadily since 1883: From mineral water producers to gas producers and distributors to specialists in dry ice and CO₂ plant construction. Our product portfolio is based on the knowledge gained from over 130 years of experience in the field of CO₂ and dry ice.

We have recognized that only continuous development and improvement of our products will secure our future and the success of our customers. Our ISO certification underlines the high standards we set for our products and services (IQNet ISO Certificate 9001:2021 and SQS Certificate ISO 9001:2021)



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ASCO - ALL ABOUT CO₂

“All about CO₂” – Actually, our credo says it all: At ASCO, we are exclusively committed to this specialty gas in all its facets and variations. In more than 130 years, our technical experience has grown out from our customers’ needs and market requirements. Based on this knowledge in the recovery, production and application of CO₂ and dry ice, we create added value for our customers.

Innovation is the key for our mutual success in the future. This means more than just the development of new products: We focus exclusively on the individual requirements of our customers. In addition to technologically advanced machinery and equipment, our product range includes special purpose-projects, security concepts, training and consulting

– simply all the components to bring a CO₂ project to a successful conclusion.

In the dry ice blasting market we specialised in providing individual and complete solutions for specific customer needs. Such individual solutions can start with a single blasting unit and go further to in-house dry ice production, CO₂ delivery or special projects like noise control booths or automation projects which increase the quality and flexibility in the working process.

ASCO Dry Ice Blasting means powerful and gentle cleaning of all kinds of surface. Decades of experience in dry ice blasting and a highly motivated team have brought us in the dry ice blasting technology to where we stand today: We are the specialists when it comes to introducing or optimising dry ice cleaning in your company. Our ASCO Dry Ice Blasting System offers a one-stop service for individual all-in-one solutions.

ASCO Dry Ice Blasting is a cleaning method that is tailored to your individual needs – for more quality and flexibility in the daily working process.

ASCO Dry Ice Blasting – Gentle. Powerful. Cost-saving. Unique.



ASCO Dry Ice Blasting
means efficient and gentle
cleaning of different surfaces

→ Gentle

→ Economical

→ Efficient

→ Unique

ASCO
All about CO₂

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