

A New Packing Technology for filling Refractory Products

Engelbert Koess *, HAVER & BOECKER OHG.

Abstract

As a technology group, Haver & Boecker /Germany enjoys a leading position in the international markets of packing technology.

THE HAP (HAVER ADAMS PROCESS) filling system is an innovative FFS (Form Fill Seal) packaging system for filling powdery products into PE plastic bags. For the first time this new technology has been installed in the refractory industry with great success. The main advantages are dense packing, cleanliness during bag filling and throughout the entire product transport, handling and distribution chain, optimum product protection, an extended shelf life and an improved optical appearance. An additional positive effect is the higher resistance to tearing.

1. Introduction

Refractory producers are faced with the demand of their market to receive clean and compact bags with high weight accuracy. Regulations concerning allowable dust emissions call for clean filling processes, especially for tight bags.

Today's production processes require flexible machine technologies that assure short changeover times and maximum operational availability.

2. Integrated filling machine technology as one compact unit

The HAVER-INTEGRA® is a fully automated and well-engineered system for the filling of valve bags which meets the greatest demands. This integrated machine technology also guarantees, in fine adjustment of the product, the packaging means and the machine, the optimum advantage for the user.



Fig. 1 Bag placing, bag filling and bag sealing within an INTEGRA.

This compact machine is a system in which the automatic valve bag placer, the filling technology adapted to the individual application, the ultrasonic valve sealing device, the control and service unit and the discharge belt are encapsulated in one common casing.

The entire unit will be completely preassembled, the compressed-air piping and cabling be laid by the supplier, so that a presetting in the works is possible.

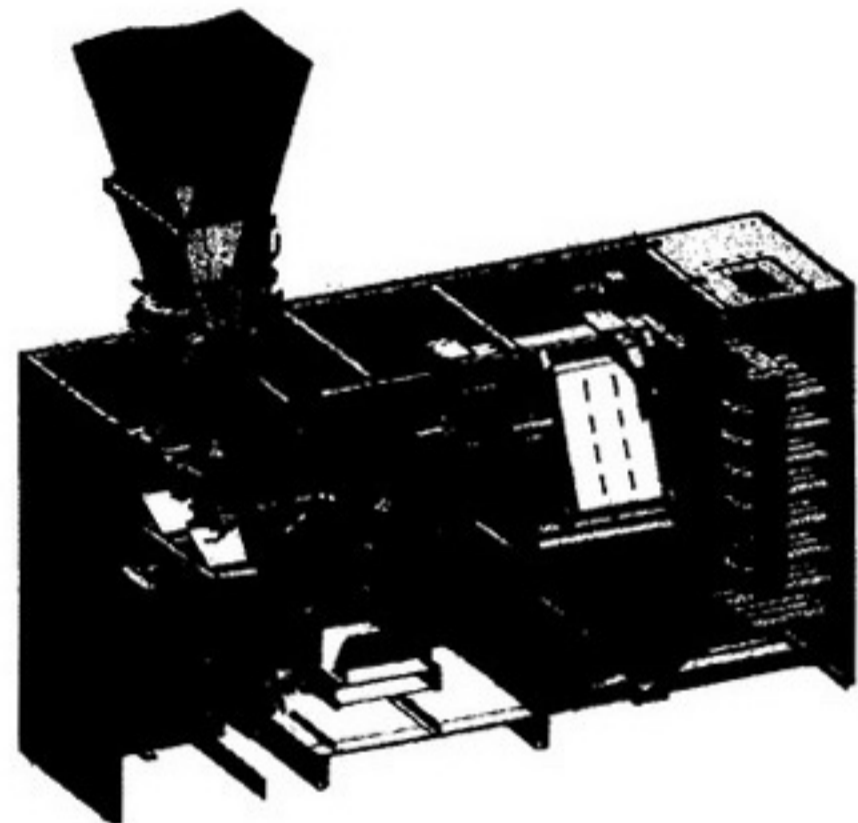


Fig. 2 An inside view in the machine cabin.

The filling system according to the air type technology with a fully aerated pressure chamber equipped with a conical inlet valve prevents segregation and ensures a very gentle product handling at a low pressure and minimized fluidizing air volume.

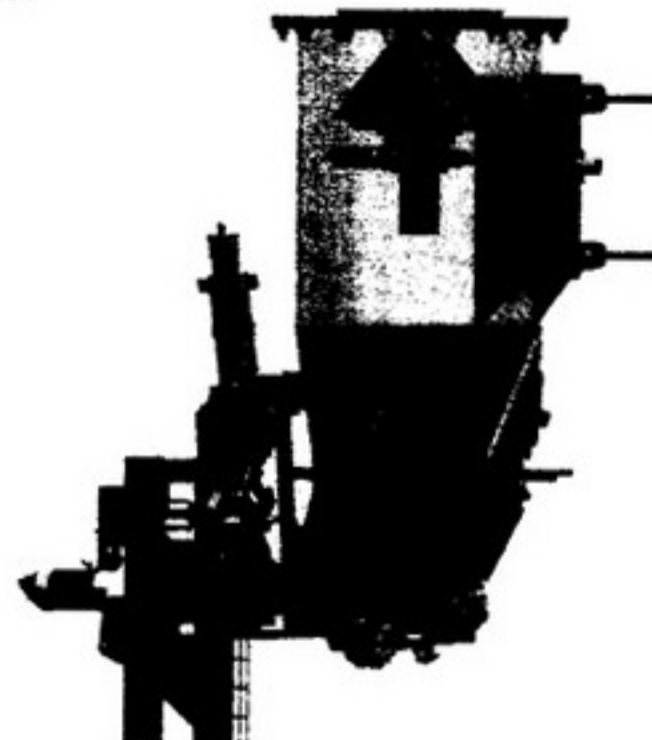


Fig. 3 Fully aerated pressure chamber of the filling system preventing segregation.

Table 1 Main advantages of the INTEGRA

Feature	Advantage
Completely capsulated machine design	Avoids noise and dust extraction
Dialog based operating interfaces and display	Easy and fault free operation
Automatic adjustment devices	Fast format and product change upon the click of a button (99 different sorts for pre-selection)
Wired and tubed to one power and compressed air connection point	Easy preparation on the building site for installation
The system is complete in-factory assembled and tested	No errors during start up and commissioning
Service doors equipped with large windows	Easy access to all machine components and constant visual control over all functions.
Windows with safety glass	Scratch proof and antistatic glass ensures clear vision
Easy transportation via suspension frame	High flexibility and safe installation
Short installation period	Reduced service costs
"all in one" design	Minimum space consumption

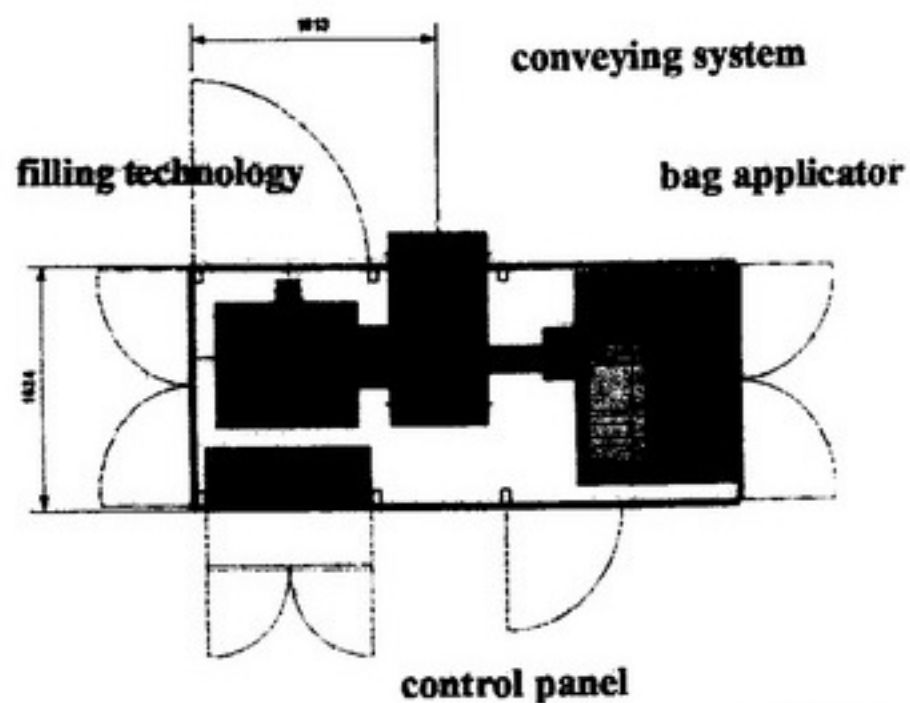


Fig. 4 Minimum space requirements of the "all in one" unit.

Commissioning on site is only required to adjust the product-specific settings. Due to the modular design of the system, all the different kinds of filling technologies as well as bag magazines can be applied, adapted to the respective application.

As the system is delivered to the customer ready for production it can be installed according to the "plug'n pack" concept and put into operation in a very short time.



Fig. 5 Installation of the compact unit.

3. High Performance Packaging for Moisture Protection

Besides the demands mentioned before, high protection of the filled products against moisture becomes a more and more important requirement a packing must comply with. Up to now, technology has set limits to these requirements, since many systems were based on the use of paper bags. The result always used to be a compromise between the quality of product protection and degree of productivity of the bagging plant.

Many manufacturers of moisture sensitive powder products want to prolong the storability of the packaged products and even allow the pallets with the filled bags to be stored out in the open or transport the bags without any further protection, i. e. exposed to all kinds of weather. The paper valve bag cannot comply with these requirements, but the PE bag in connection with Form-Fill-Seal Systems (FFS) does. In order to achieve the desired product protection, the filled bags must be virtually hermetically sealed.



(a) Perfect stacking

(b) Clean, sealed and compact bag

Fig. 6 Clean, compact and weather proof plastic bags.

In order to develop and supply sophisticated plants to the refractory industry, a wide basic knowledge of the properties of the product to be filled and of the different bag designs is required. HAVER & BOECKER is in the position to carry out the required product analysis as well as bagging tests with the various filling systems in their well equipped R & D center.

Based on 80 years experience in packing machines, own analysis, as well as on extensive bagging tests, H&B has developed THE HAP® which will be detailed in this paper.

THE HAP® (HAVER ADAMS PROCESS®) filling system is an innovative FFS (Form Fill Seal) packaging system for filling powdery products into PE plastic bags. It joins the proven FFS systems which are used for filling granular and pelletized products.

This newly developed HAP system offers the following advantages:

a. Cleanliness:

Filling: Leakage is prevented by a complete seal between the filling opening and filling spout.

At the consumer: Clean bag handling, due to the non-perforated closed bags no material can leak out, even during conveyor transport storage and transport to the consumer.

b. Seal:

A fully closed PE bag with a non-perforated surface means high product protection, better storage capabilities and water resistance.

The moisture resistant labyrinth air removal system provides permanent air removal from the bag. This helps prevent bag breakage.

c. Compactness:

A filled bag with a box-shape means trouble-free and secure palletizing. Transport and storage capability are optimized and an aesthetic appearance is provided for the customer.

With this new design, when compared to conventional packing plants, the plant layout can be significantly simplified because bag cleaning and spillage return systems are no longer needed. This allows the use of smaller dedusting units. In addition the height of the entire system can be reduced, which makes it possible to save on building costs.

Due to the elimination of leakage, bag transport to the construction site is done without losing the accurate target weight reached during the bag filling process

And because of the general reduction in dust levels, work conditions for employees are significantly improved, and wear and tear to the transport and palletizing systems are drastically reduced.

Besides the demand for product protection, this new kind of packing also provides a better quality as far as the optical appearance is concerned, resulting in an increased customer acceptance. A high-quality print image can only show to advantage if the bags are clean. These criteria as well as a perfect shaping of the bags are accomplished by means of the HAP filling systems.

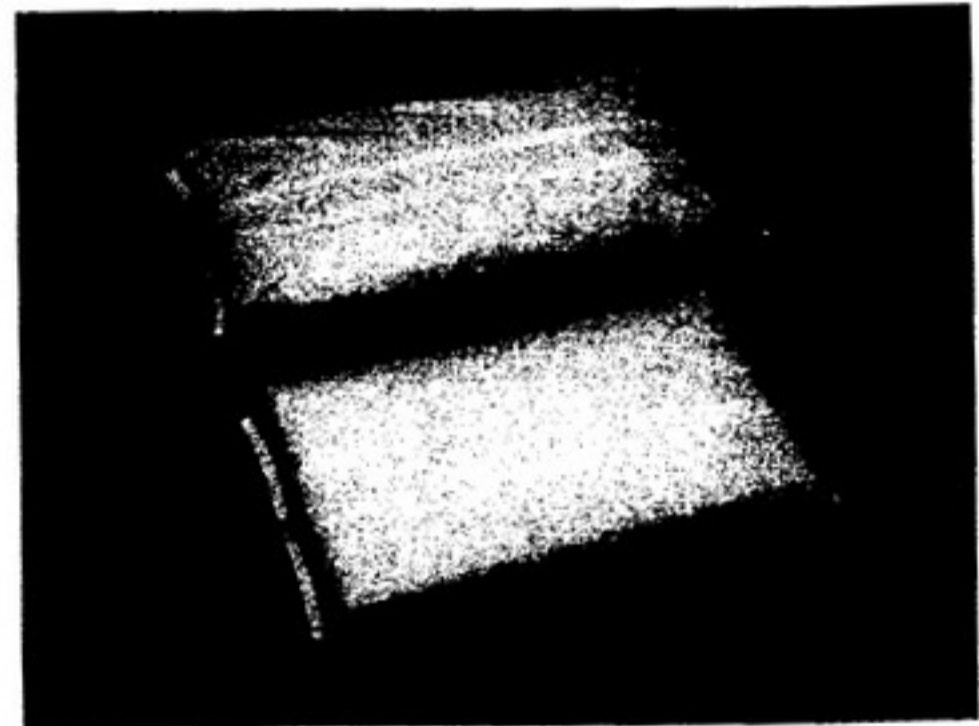


Fig. 7 Comparison between compacted and non compacted FFS bag.

In an increasingly competitive market as the refractory industry, tightly sealed, clean bags and "picture perfect pallets" offer competitive advantages. The HAP filled PE-bag makes an important contribution to this. An additional positive effect is the higher resistance of the plastic bag to tearing.

4. Summary

The HAP System covers two ranges for small and medium capacities:

THE BENJAMIN as well as one version for higher capacities, THE ADAMS®.

THE BENJAMIN® is the compact variant of the successful ADAMS system, and it has 1-4 filling modules. It is designed to handle middle range capacities for packing products into plastic bags made from a tubular film.

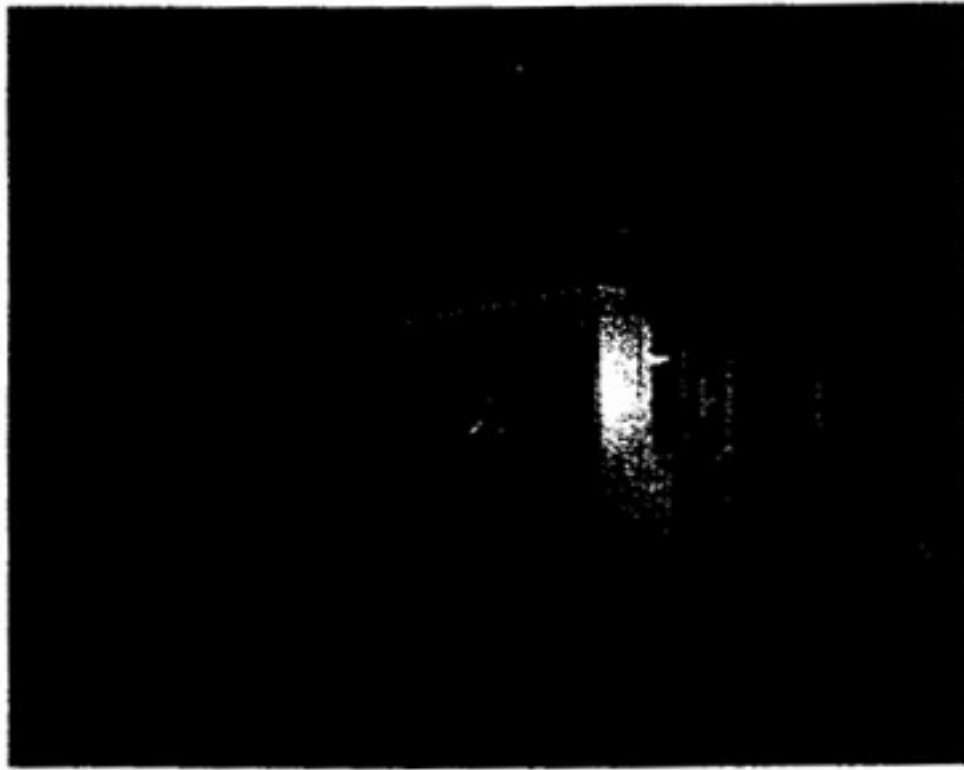


Fig. 8 Total view of "THE BENJAMIN"

THE ADAMS® is a rotating high-speed system with 8 or 10 filling spouts. It can reach a packing speed of up to 2.000 bags per hour.

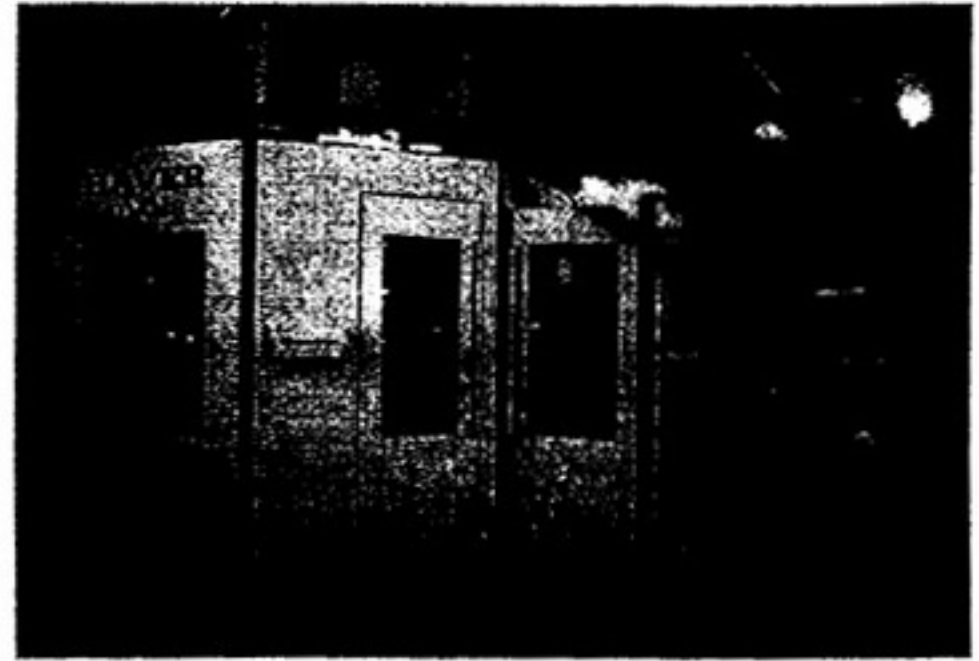


Fig. 9 Total view of "THE ADAMS®"

The vital interest expressed by the market has shown that both, THE ADAMS and THE BENJAMIN, cover the market requirements and their technology ensures that the product quality remains excellent for a considerably longer period of time. As outdoor storage is now possible, completely new logistics concepts could be put into practice.