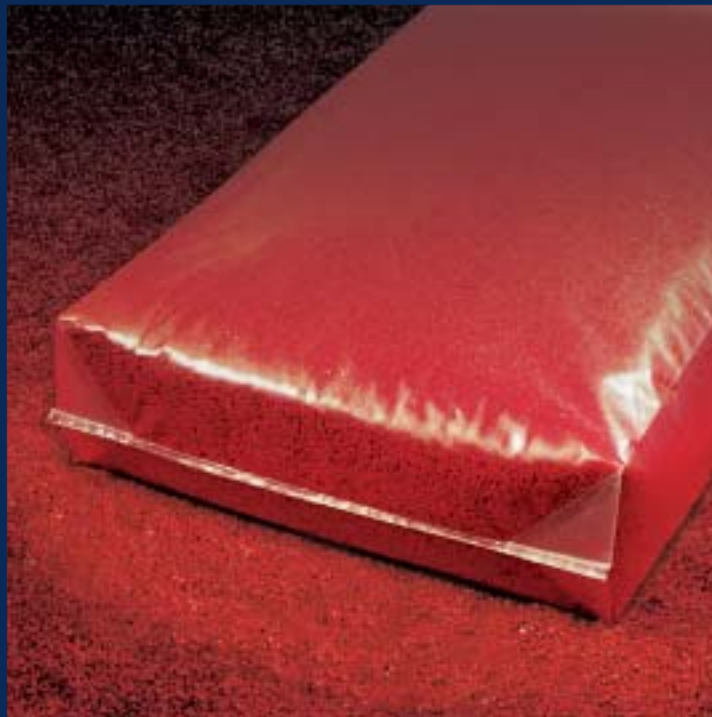

HAYER & BOECKER



Information



HAYER
Form Fill Seal
Technology

Form Fill Seal

HAYER & BOECKER has secured a leading position in the international market concerning weighing-, filling-, and classifying technology. Over 20 years experience with FFS technology provided the solid foundation for global and technological competence. The resulting experience combined with the integration of modern and well-proven technology meets customer requirements worldwide. With this philosophy, HAYER & BOECKER has earned the international reputation as a reliable industry partner.

“Reliability” has become a success and performance factor for FFS technology. HAYER FFS packaging systems are the ideal solution for free-flowing granular, micro-granular, or powdery bulk materials.

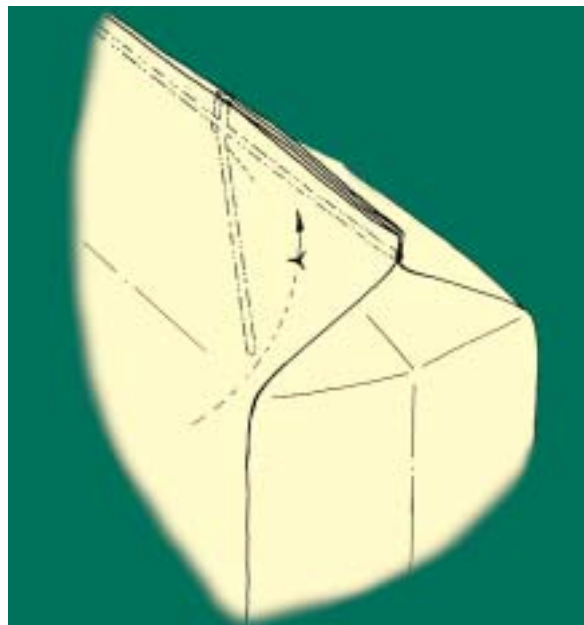
It is also an economical solution providing an “inline” manufacturing of the bag from a side-gusseted film roll as well as filling and sealing. An automatic and precise process, environmentally safe, and cost efficient.

Qualified for bagging of hazardous materials, FFS technology from HAYER is economical and safe.

HAYER FFS machines are designed for processing of mono- or co-extruded neutral or printed plastic film made of PE or PP (80-250 micron).



Side gusseted film reel



Check Valve Type de-aeration

Aluminum laminated plastic films for hygroscopic or odor-sensitive products can also be processed on HAYER FFS technology. Plastic film tolerances concerning film thickness, accuracy of film winding, or wrinkles in the side-gussets are automatically compensated for by the FFS machine.

The question of bag deaeration is a matter of defining the requirements:

- labyrinth deaeration through the corner seals,
- perforation of the plastic film
- residual air evacuation provides reliable function with the HAYER FFS machine.

Technology

Reliability is a result of HAVER's filling technology combined with well-proven concepts and modern technology inter-linked to modules part of various HAVER FFS machine types.

The know-how advantage is in the system combination of weighing and filling technology (HAVER can provide everything out of one hand); providing clear advantage for the user. To name a few advantages, the design considers minimum loads on mechanical modules at maximum productivity and precision for the whole process from product densifying to palletizing. Change over to different bag formats and maintenance is operator friendly all the way from product feed to the finished and filled bag. These are advantages with a positive impact on a fast return of investment.

HAVER FFS machines offer reliability into the smallest detail: intermittent bag pull-off, pre-adjusted to the required bag length.

An integrated film buffer assures smooth and accurate pull off. Top and bottom seal stations are identical and interchangeable in all HAVER FFS Machines providing an accurate seal with a maximum film extension of only 5-7 mm. Self-adjusting bag transfer grippers control the entire bag transfer from the empty bag to the filled bag.



System Configuration

HAVER Electronic Netweighers represent the worldwide standard of technology for accurate weighing with high capacity. HAVER FFS technology and weighing technology ('out of one hand') provide a vital advantage to the customer.

Changes and adjustments can be made easily and user friendly with motor-driven adjusting units

with the parameters stored in a PLC. Therefore, human error and time-consuming manual adjustments when changing bags are a thing of the past. The full bag vibrator is adjustable in time and vibrating amplitude for optimum densification for different product types. A bag discharge, bottom first, provides a bag transfer which will assure proper product

distribution in the bag for ideal stacking characteristics.

FFS Alpha

The HAVER FFS “ALPHA” has made its name as a compact all-round Form-, Fill- and Seal machine.

The FFS “ALPHA” is designed for free-flowing granulated products of up to 400 bags per hour. The machine is designed

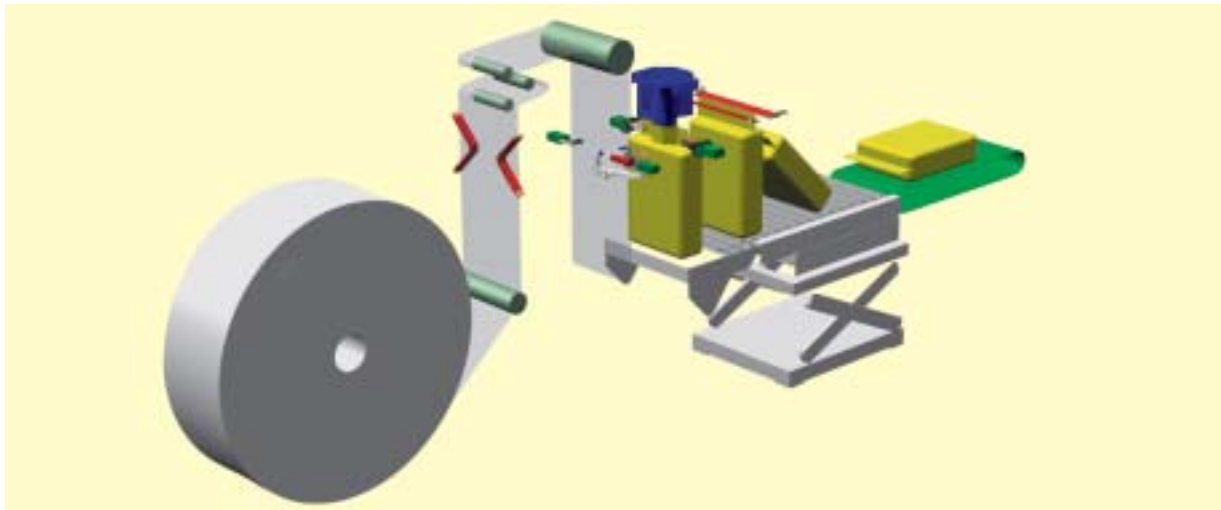
to process bags with a width of 270 mm - 440 mm and a length of 500 - 1,000 mm.

An outstanding performance characteristic of this machine is the degree of flexibility considering bag reel and format changes.

Other design advantages are a non-moving filling spout, making clean out easy when changing products.

Corner sealing device, air evacuation feature and gross weighing can be integrated into the modular design

structure of the FFS “ALPHA”.



Function FFS ALPHA



FFS ALPHA

FFS Beta

A machine for Form-, Fill- and Seal applications with a capacity of 800 bags per hour is the HAVER FFS Machine Type "BETA". This machine is used for applications for filling of micro-granular, gritty products and free-flowing powders.

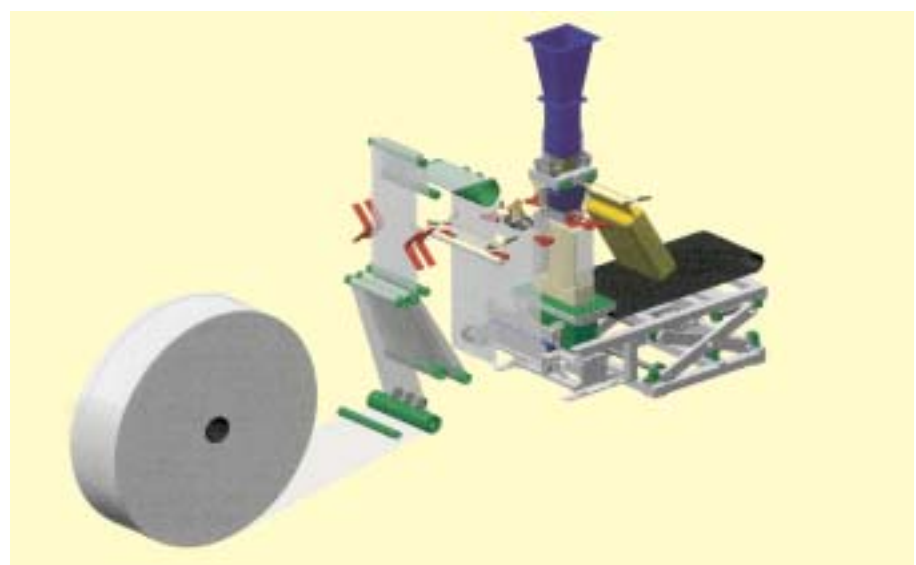
The machine is designed to process bags with a width of 350 mm - 420 mm and a length of 600 mm - 950 mm with a side gusset of 50 mm - 100 mm. The required compressed air is 0.1 Nm³/bag with dedusting air requirements of 750 m³/hour for processing of 10 - 60 liter volume bags.

Various types of filling spouts allow for a proper match with a diversified range of products to achieve minimum amount of dust during the filling process.

The FFS "BETA" with its modular design provides the required flexibility for each packing operation. This flexibility allows for future changes of requirements of upgrades of technology.



FFS BETA



Function FFS BETA

FFS Gamma

The HAVER FFS “GAMMA” provides an economical solution for high-speed bagging of bulk products for capacities of up to 1,600 bags per hour. The machine provides maximum efficiency due to the harmony between the weighing system and FFS machine.

Compressed-air requirements are 0.08 Nm³/bag with dedusting air requirements of 750 m³/hour.

Overall, the most economical solution in Form-, Fill- and Seal Technology.



Top picture: FFS GAMMA

Left picture: Reduced film consumption by minimum film excess above seam.

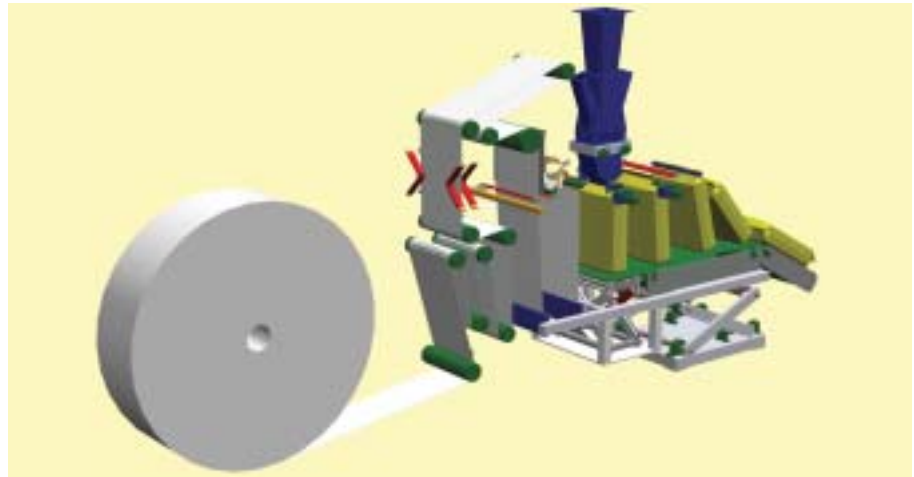
FFS Delta

The highest standard in technology is presented in the HAVER FFS Machine Type "DELTA".

FFS "DELTA" characteristic: Capacity of up to 2,200 bags per hour.

Typical HAVER characteristic: No component of this high-speed design is pushed to the limit.

The higher capacity of the "DELTA" version is achieved with a modified film supply and contact cooling of bag seams. FFS systems from HAVER: Machine Technology, Flexibility and Custom-Tailored Productivity!



Function FFS DELTA



FFS DELTA in mobile design on air pads.

Control Systems

System interlink hard- and software components for all HAVER machine controls are designed and manufactured in our company by our specialists. The advantages for the application are obvious: high availability and maximum flexibility.

In order to achieve the ideal degree of automation, HAVER designs system-specific software combined with first-class manufacturers of PLC hardware.

Bus systems provide for trouble-free data transfer within the machine control and communication with the operating personnel.

Plug-in cables and remote I/Os are installed at the machine and connected via a bus system with the PLC, minimising machine wiring during installation.

User-friendly graphic displays, sensor controlled visualization, and PC-based monitoring systems simplify the use of the FFS machine and provide higher availability. Also, preventive maintenance and identification of problems are simplified.



PLC S7-300 with Profibus Interface L2-DP



Control panels integrated in the machine enclosure
power element



control element

User-friendly and logical schematics as well as the PC-based software are characteristics from HAVER.

FFS technology from HAVER maximum reliability for real world application with numerous control, monitoring and test possibilities.



Top picture: FFS operator interface with weigher terminal and MEC III and operator panel BT1000.

Right picture: Operator panel DT1000 with product pre-select function.



Weighing Technology

Advantage: HAVER weighing technology - fine tuned to the filling system.

HAVER Netweighers with patented discharge metering system provide fastest, accurate filling time for free-flowing products. Intermediate hoppers with dosing cones and similar measures are not required.

HAVER gross weighing systems are used for absolute gentle product metering or limited head room. When using this weighing technology with our FFS machines, the filling spout is directly connected to the load cells, performing the weighing function with the bag suspended from the filling spout.

Electronic control functions provide automatic adjustment to different product flowing characteristics and parameters.

Low maintenance is a standard of HAVER weighing technology.

A closely-knit quality control system in the production process and the use of well-proven design components provide for simple exchange of parts and well-controlled spare part inventory. The easy clean-out features for product or batch change is a feature which comes automatically and does not need special emphasis.



Top picture: Duplex weigher with automatic water wash down.



Right picture: High-capacity netweigher with rotary slide valve inlet and servo drive.

Corner Seals

A diagonal seal across the individual side gusset provides for optimum formation of the bag-top and bottom.

The advantages of the corner seals are an improved bag geometry, higher strength in the area where two layers meet four layers, and stackability resulting in a better appearance in the palletized condition. Another advantage is easier clean out of the bag (less residual material).

An integrated part of the bag making process is the impulse sealing device. Necessary changes in bag size can be achieved with motor-driven adjusting devices.

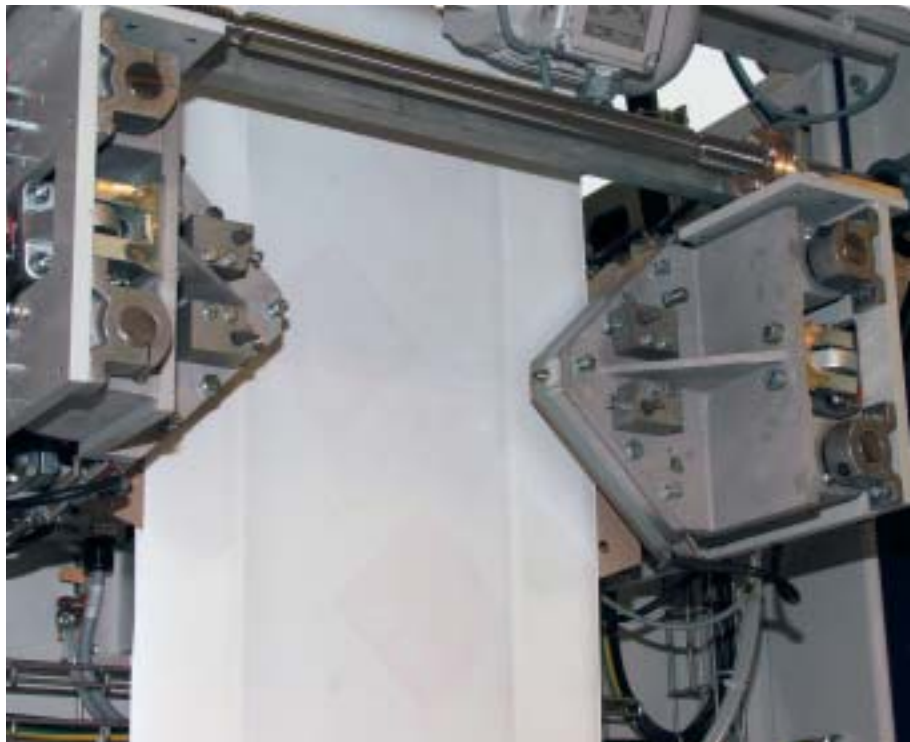
Welding regulators in the HAVER FFS machine monitor and control the quality of the bottom-, top- and corner seal performance. Evaluation of actual performance data assures continual and uniform welding temperature for quality seals achieving maximum performance of the welding tools.



Top picture: Bag shape comparison with and without corner seals.

Left picture: Bag stack with corner seals.

Bottom picture: Corner sealing with integrated needling.



Modules

The reel lifting device of HAVER FFS machines is user-friendly designed keeping in mind minimum reel changing time and simple operation. Optionally available is a hydraulic lifting device for the reel arm. A built-in alarm system warns the operator of low film and film end. These features provide the machine operator with more time to attend to other tasks.

A bag opening station is a feature prior to the filling spout, assuring proper placement and opening of the bag. Bag transfer fingers with sensors contribute to high machine availability. With these features, suction devices are not required in the area of the filling spout.

An ideal filling level in the bag is achieved with the bag vibrator located underneath the filling spout. The feature is especially important for products with difficult flowing characteristics. Amplitude, vibrating time and the beginning and ending vibration time are adjustable to each product.

Uniform for all FFS machines are the impulse welding stations providing highest seal quality.

Sealing temperature, -time, and -pressure determine the seal quality. The different parameters for different plastic film are stored in the PLC memory.



Hydraulic reel lifting device.

An integrated cooling system provides controlled cooling for quick cooling of the seam. The bag is separated with a linear-driven cutting

knife designed for high-performance duration.

Pairs of bag grippers maintain a fixed position of the empty as well as

filled bags throughout the bagging cycle. Secured bag transfer is another precondition for quality seals.



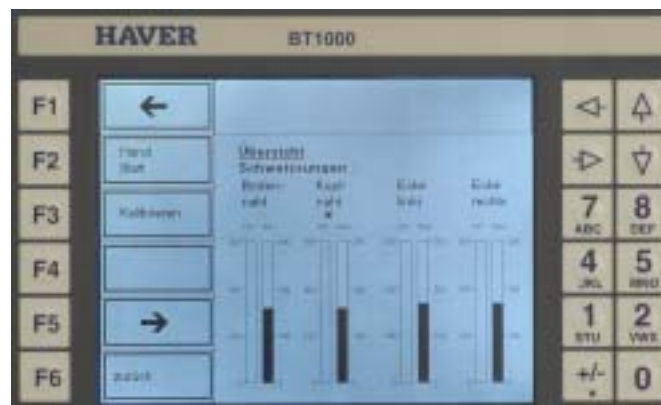
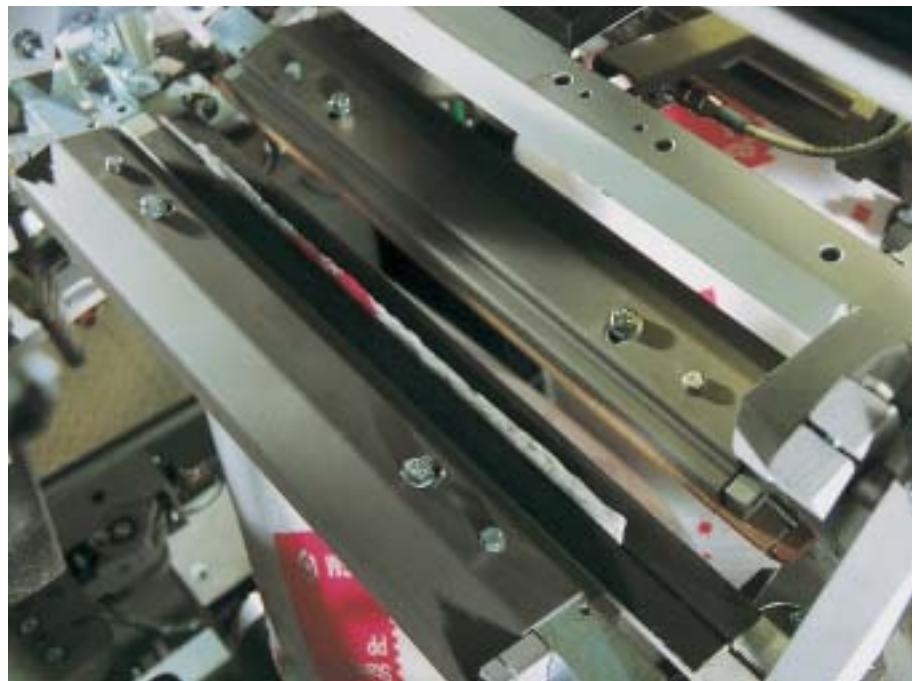
Bag opening station.



Bag vibrator.

Resistron regulators, specially designed for the use in HAVER FFS machines, guarantee the high quality seal. The low energy consumption and high dynamic control circuits are an integrated part of the overall system.

Alarm messages are provided for heater band breakage. The temperature control - with actual working temperature range indicated in °C - prove the advantages of HAVER FFS machines time and time again.



Top picture: Top sealing station with Teflon rewinding feature.

Left picture: Indication of welding temperature in operator terminal.



Bottom picture: Sort associated input of welding parameters at the operating terminal.

Systems

The performance profile of HAVER & BOECKER has established customer confidence, based on trust, cooperation and partnership.

It has been the objective of HAVER & BOECKER to discover or develop suitable solutions for unusual applications.

By tradition, HAVER has been striving for progress which, at the same time, has become our obligation and challenge.

HAVER System designs are a synonymous trademark in all industrial nations. It covers a wide range of diversified intelligent technical solutions in material handling, ranging from product transport, storage, pro-



FFS DELTA mounted mobil design, on wheels.



Logistics center for plastic granular.

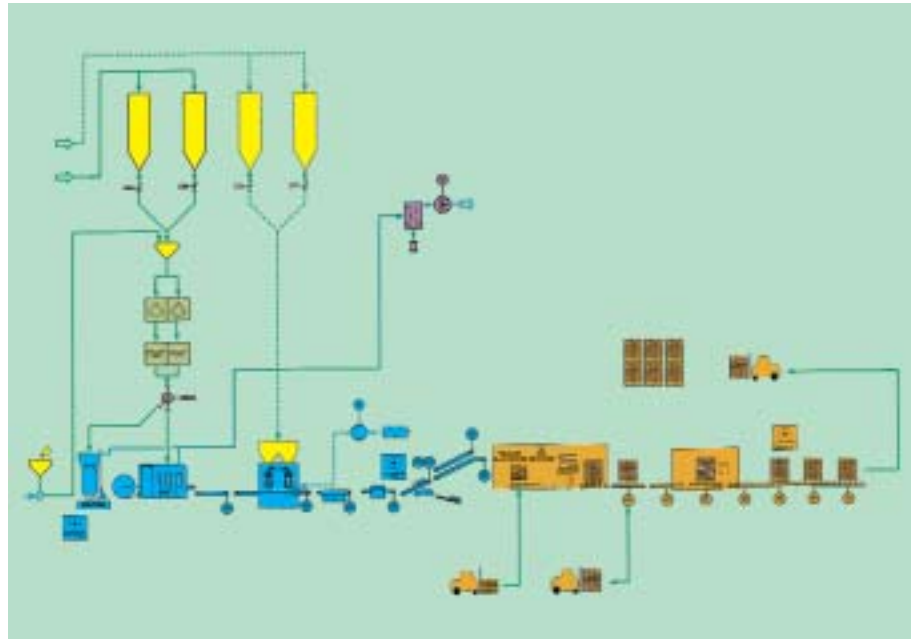
cessing, packing and loading. From the engineering phase through machinery start-up and commissioning to maintenance - All Out Of One Hand.

Worldwide activities and sales in over 130 countries are testimony to HAVER's initiative, innovation and proximity to the customer - customers who have become partners and business friends due to successful cooperation - lasting and worldwide.

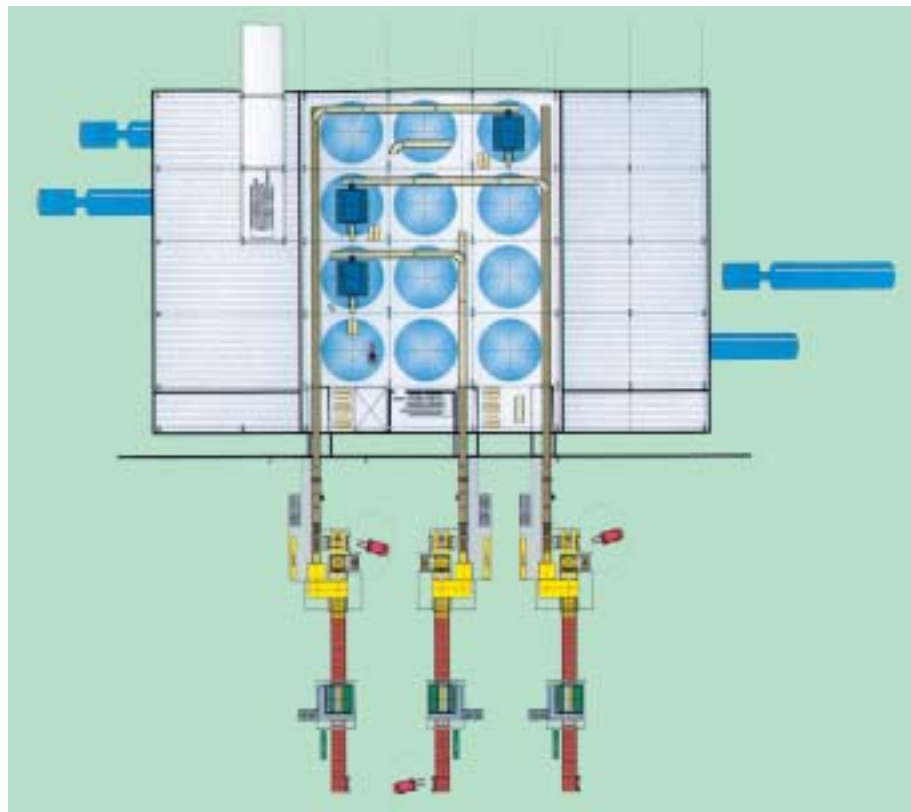
HAVER offers more than just machinery. Our system technology is backed by consultation and service reaching beyond purchase and start-up; offering the guarantee for all machinery installations, spare parts supply as well as service in over 130 countries.

Our machinery and installations are accompanied by service. From the early beginning of project origin to future modernization after a long successful operation, HAVER offers the kind of service expected by customers.

**HAVER & BOECKER -
Your innovative partner
and guarantor for
quality.**



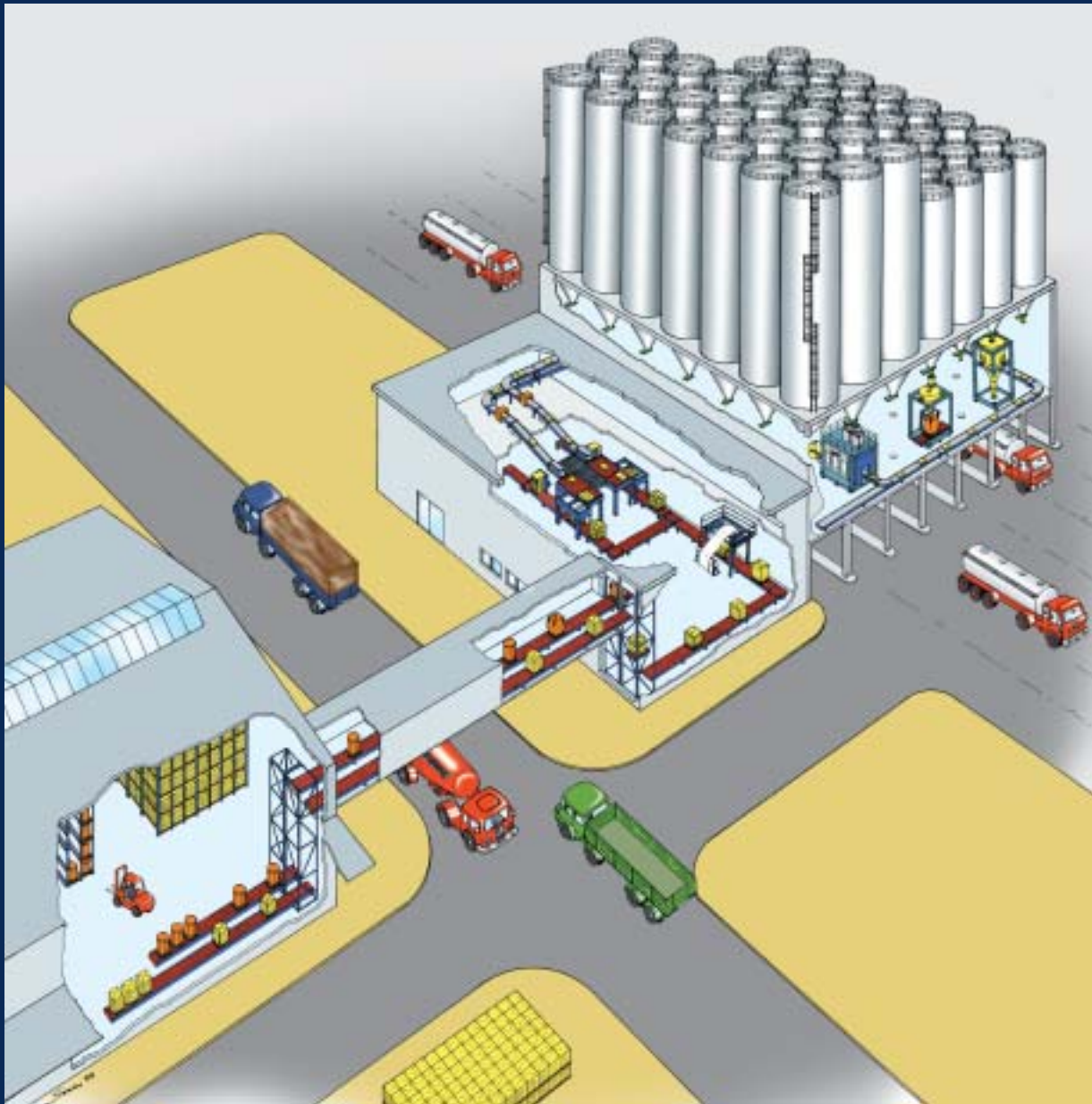
Flow sheet diagram



Complete bagging plant with movable FFS Delta

Form-, Fill- and Seal Systems for **HAYER** :

**Technology, flexibility
and productivity custom designed.**



FFS logistic terminal

PM 201 E 2699 0604 1 Fe

The machines and plants shown in this leaflet as well as the stated technical parameters are examples of customer-specific technical solutions. Therefore they are subject to modifications.

HAYER & BOECKER

P.O. Box 33 20 • D-59282 OELDE, Germany • Phone: +49-25 22-30 0 • Telefax: +49-25 22-30 4 03
E-mail: mf@haverboecker.com • Internet: <http://www.haverboecker.com>

Affiliated Company USA: HAYER FILLING SYSTEMS, INC.
Phone: +1-770 760-11 30 • Telefax: +1-770 760-11 81
E-mail: sales@haverusa.com • Internet: <http://www.haverusa.com>

Affiliated Company Brazil: HAYER & BOECKER Latinoamericana M^àqs. Ltda.
Phone: +55-19-3879-91 00 • Telefax: +55-19-3879-14 10
E-mail: haverhbl@haverbrasil.com.br • Internet: <http://www.haverbrasil.com.br>

Affiliated Company France: HAYER FRANCE S.A.R.L.
Phone: +33-1-39 11 80 80 • Telefax: +33-1-39 11 80 89
E-mail: contact@haverfrance.fr • Internet: <http://www.haverfrance.fr>