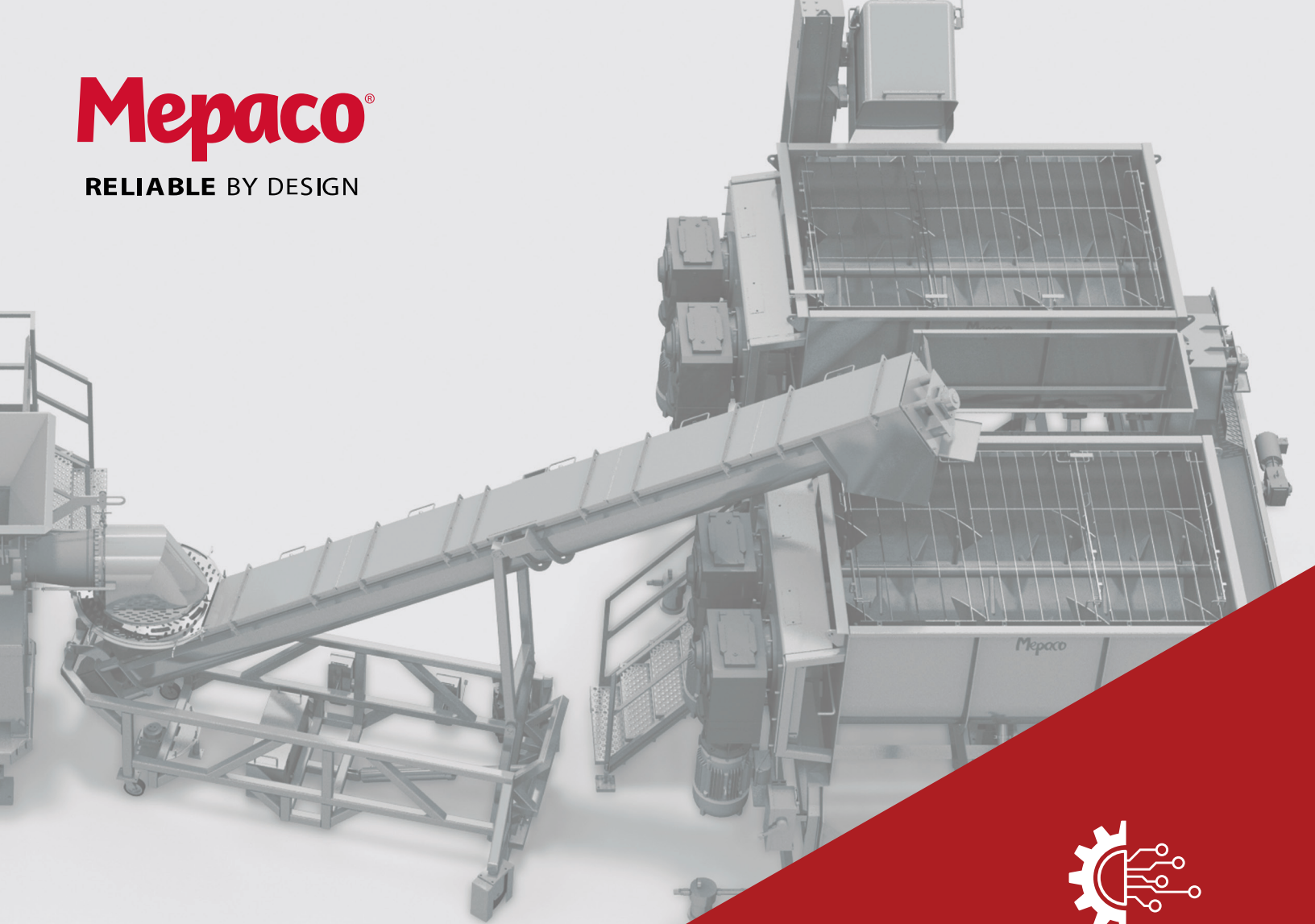


Mepaco®

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**AUTOMATION
TRENDS**

PROCESSING AUTOMATION TRENDS

Equipment and Controls Options that
Reduce or Assist Manual Tasks

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77%
of manufacturers surveyed agree to ongoing difficulties with labor shortages beyond epidemic levels

PROCESSING AUTOMATION TRENDS

Deloitte and the National Association of Manufacturers published a workforce survey and discovered 77% of manufacturers surveyed agree to ongoing difficulties in attracting and retaining workers years beyond epidemic levels.*

Automation will continue to drive changes in all segments of manufacturing. Workforce availability and reducing manual processes is becoming a heavily rated factor for the cost justification of automation.

In a round table discussion of Mepaco® application specialists, engineers, sales and service technicians, the team offered up trends and considerations from component-level options to entire system solutions that help solve automation and reduce labor in food manufacturing processes.

Mechanical Options and Modifications that Reduce or Assist Manual Tasks

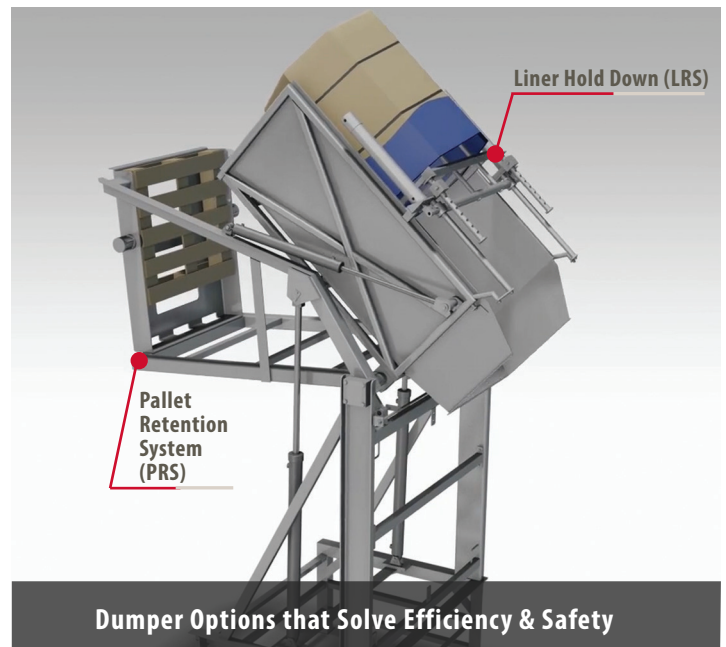
Dumping

While most dumpers are manually loaded, some options can reduce operator resources and improve safety at the same time.

PRS (Pallet Retention System) A pallet retention system will prevent manual intervention of pallet debris entering the food stream.

Liner Hold Down An added option is a hold-down mechanism that prevents the liner from entering the food stream.

**Automation and Food Processing Today: It's About Labor. Food Engineering (2022)*

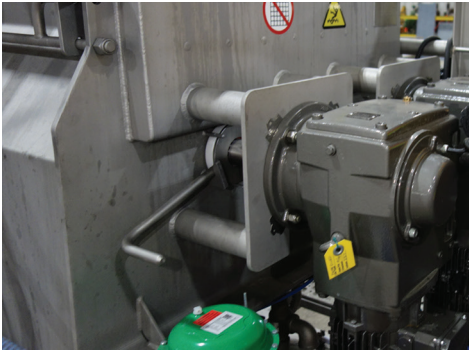


The PRS and Liner Hold-Down options prevent an operator from manually removing debris and prevent ergonomic and safety issues from leaning over equipment to perform clearing tasks.

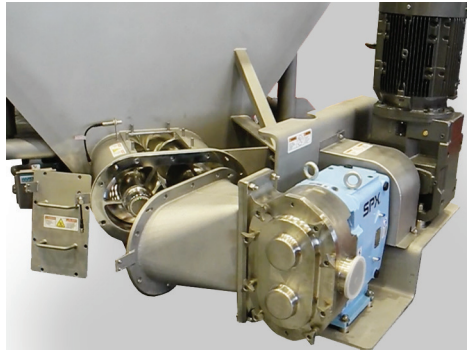
Dumper Controls With a full safety enclosure and controlled dumper system, the load set point, detraction, and down control can be integrated into the HMI (Human Machine Interface).

The dump function can also be automatically timed to feed downstream equipment using loss-in-weight or level sensor technology.

The safety enclosure can also be designed and controlled to open automatically for loading and pallet removal.



Quick Release Seal



Swing Away Pump for Quick Access



Tool-less Scraper Removal

Tool-less Component Removal

Depending on the application and compliance protocols, some components may still require removal for additional COP (Clean Out of Place) sanitation. Components designed for tool-less, quick removal will stretch lean sanitation and maintenance staffs. Examples of tool-less and easy component removal include seals, gaskets, and scrapers.

Common Seals used in Food Processing



Split Seal



Air-Purge Seal



Mechanical Seal

Seals

The previously mentioned split seal is constructed with sanitary (white) neoprene house gasket and dual Garlock silicone seals. The quick-release seal provides quick tool-less access for maintenance and sanitation, however some processors opt for a self-cleaning seal, such as air-purge or mechanical seal.

Air-purge seals are specified for applications with a high degree of food safety risk. The internal components of the seal rotate with the shaft, so there are no typical issues with worn shafts or missing packing. Air-purge seals are significantly less maintenance than split seals and reduce sanitation costs.

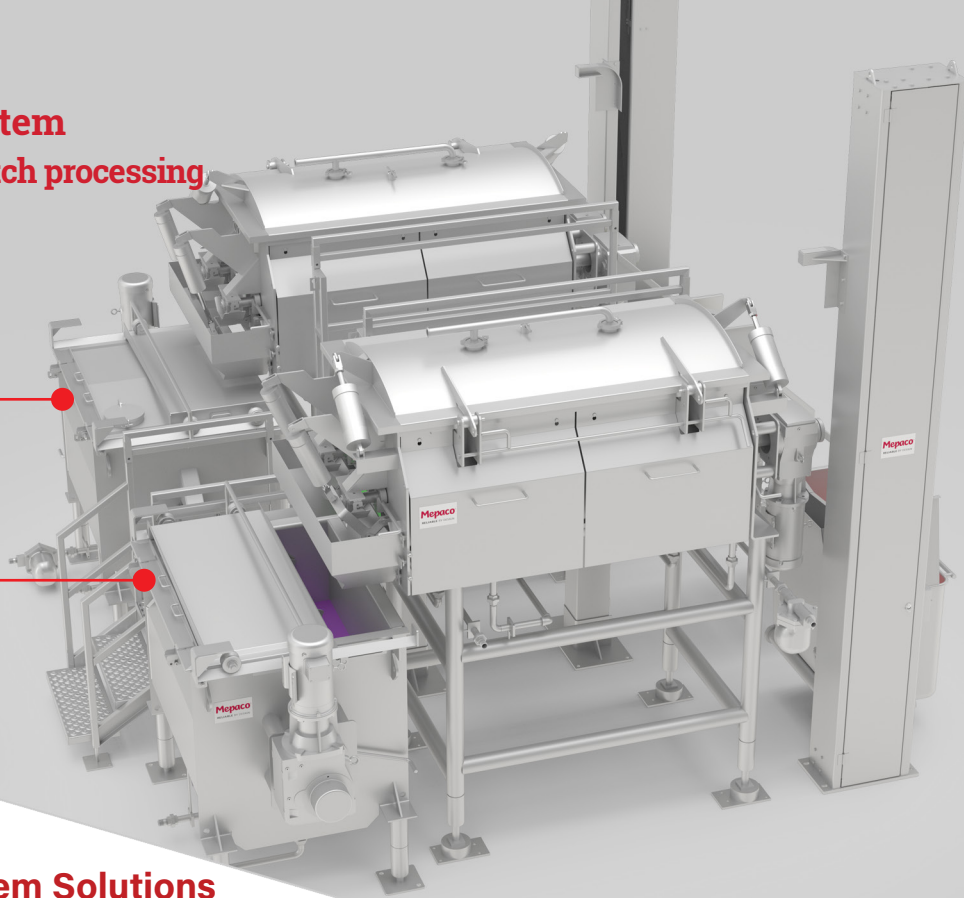
Mechanical seals are specified for applications with coarse, gritty food product. This type of seal is precision-installed and do not require regular maintenance. Mechanical seals are engineered for CIP sanitation processes.



Dual Cooker System with continuous batch processing

Buffering Mixer

These Buffering Mixers allow another cooker batch to begin while maintaining product temperature and agitated product suspension until downstream equipment signals readiness.



Automated System Solutions

Automatic loading, unloading, and transferring

Some processors struggle with effective loading times when using non-integrated, manually intensive equipment. New equipment solutions with an integrated recipe and process control package can be engineered to solve automation goals.

Depending on the application, a screw conveyor or belt conveyor can be designed to provide the necessary feed rate for downstream processes.

Pump Feeders provide first-in, first-out metering between processes. Another benefit of Pump Feeders is surge which allows another batch to be recharged immediately upon completion. Mated with a dumper at the beginning of the processing line, the Pump Feeder can accept large loads and systematically meter product to downstream equipment.

Buffering mixers can be utilized to suspend product and maintain temperature between batches and downstream equipment readiness.



Pump Feeders help automate product transfers.

*Metering screws
and Pump Feeder
solve product
accumulation
and surge in this
application.*



Versatile Equipment

Some applications lead food manufacturers to consider equipment that allows versatile functions.

ThermaBlend®: Cooking/Blending/Chilling

The ThermaBlend® Cooker is a highly efficient cooking/blending solution with a substantial heat transfer area featuring highly efficient agitators and a patented scraper system that proves fast processing times. The ThermaBlend® Cooker is engineered for specific customer goals and is capable of cooking, searing, caramelizing, chilling, sautéing, and blending. Mixers, cookers, and blenders are highly engineered and highly controlled systems for large-scale batch operations up to 1000-gallon capacity.

Mixer-Blenders and Buffering Mixers: Product Temperature Control

Mixing equipment can be modified for the needs of the application to include direct or in-direct steam options. Cooling jackets, insulation/cladding, or injection systems (CO₂ or N₂) also add versatility to mixing and blending efficiencies.

Screw Conveyor Systems: Versatile loading while maintaining product temperature

Screw Conveyors are among the most modified equipment solutions to suit the processing layout and versatile loading positions in an automated line. If the application requires maintaining product temperature, screw conveyor systems can be engineered with heat transfer and thermal screws.

Process Versatility of ThermaBlend® Cooker

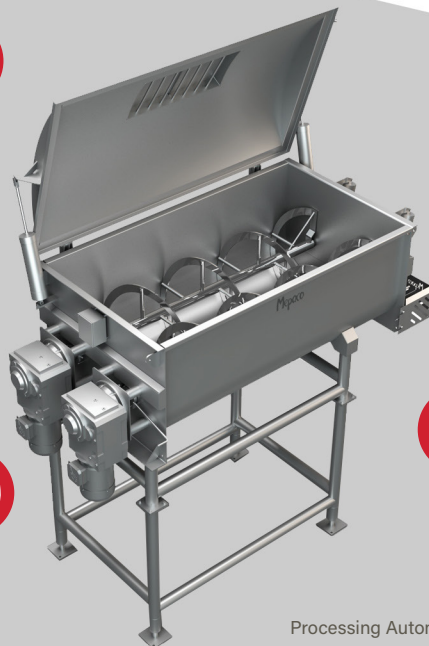
Cooking 

Blending 

Searing 

Caramelizing 

Chilling 



Versatile ThermaBlend® Cooker



Mixer-Blender with CO₂ Cooling Capability



Metering Screw Conveyor engineered for automatic loading using rail system.

ThermaBlend® showing CIP sprayballs.



CIP (Clean-in-place) Sanitation

Mepaco® is seeing a steady increase in processing customers, adding jet spray CIP options in cookers, mixers, stuffers, and enclosed screw conveyor systems. The technology uses high-pressure spray devices to saturate food processing equipment internals with sanitation fluid.

Customers seeking a new CIP solution should understand that it is an automated assist function to reduce overall cleaning time. There are efficiencies with the technology, but it still requires manual sanitation due to spots the jets cannot reach.

There are additional up-front costs with mechanical connectivity requirements such as a gasket cover and connection to the CIP manifold.

Mepaco® application and project engineers work closely with the customer and the CIP system provider to design the number of jets, water, and physical layout to tie the equipment into the preferred or existing sanitation system.

On new CIP equipped equipment, Mepaco® can provide riboflavin/UV testing to demonstrate CIP effectiveness.

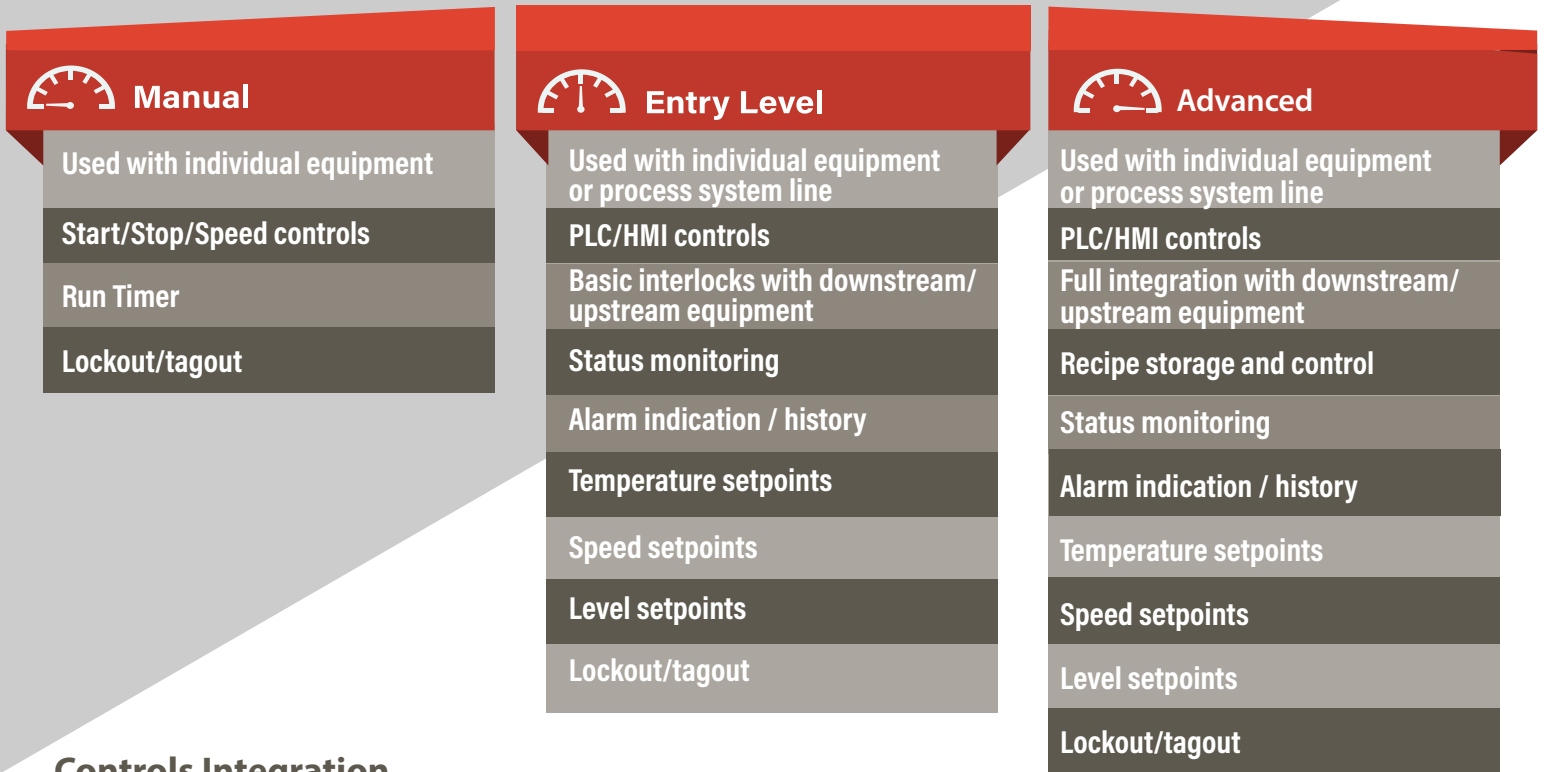
Food processors scaling production or driving an automated operations strategy opt for CIP solutions. Further, processors using CIP see a reduction in sanitation task-related injuries.

CIP technology is utilized in Mepaco® 's cookers, mixers, screw conveyors and pump feeding systems.



Metering Screw Conveyor with CIP

Levels of Controls Automation



Controls Integration

An entry-level controls solution would include a basic start, stop, and speed function. Additionally, systems can be hard wired and interlocked with downstream equipment that uses sensors to automate starts and stops. This type of base-level investment would allow equipment to pause while waiting for in-line processes to catch up, creating efficiencies and reducing the need for manual intervention of equipment control.

On the higher value spectrum, a PLC (Programmable Logic Controller) with an HMI (Human Machine Interface) control system would solve recipe automation and messaging to external equipment with level and speed feedback. This higher-end solution could also be tied into a central control system and data server.

Fully integrated systems automate entire systems, various types of data collection, recipe control and solve for reduced staffing.

The goals of the organization drive the control investment. Processors that are driving scale, automation, and enterprise data are investing in high-value controls integration.



HMI (Human Machine Interface)



It is important to note that monitoring controls packages need to be discussed at the time of project definition and scope.

The control devices and component selection will impact the engineered equipment solution.

Benefits / Challenges

In addition to labor shortages, food manufacturers are seeing a shift in the point of sale for many products. Changes in channels also require more recipes, different processing, and packaging solutions to fit those objectives, creating a case for new adaptable and versatile equipment and systems.

Most assist-level or automated solutions require an additional up-front investment. New equipment that replaces manual processes will sometimes require more floor space. At the same time, other equipment may save floor space if it solves versatile functions.

Automation will reduce manual labor, while skilled, technical operators will be required to run the equipment and systems.

The benefits, however, are significant:

- Process efficiency
- Scale with automation
- Reduced labor costs
- KPI enterprise data
- Reduced maintenance intervals
- Controlled parts management
- Reduced injuries

Mepaco® offers a custom approach to equipment and systems to meet the requirements of the application.

Condition Monitoring

Another operations trend to reduce manually intensive maintenance tasks is equipment monitoring. A monitoring controls package can be designed to detect deviations from the norm on various maintenance-heavy components. Sensors and measurement monitoring help maintenance systems and personnel to predict when a component failure might occur. Some common condition-monitoring measurements are vibration analysis, oil, thermal imaging, run time tracking, speed, and motor amperage.

When a predictive maintenance solution has been successfully established, maintenance is performed on machines only when required, resulting in reduced maintenance man hours, improved operations up-time, and more control over parts management.

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