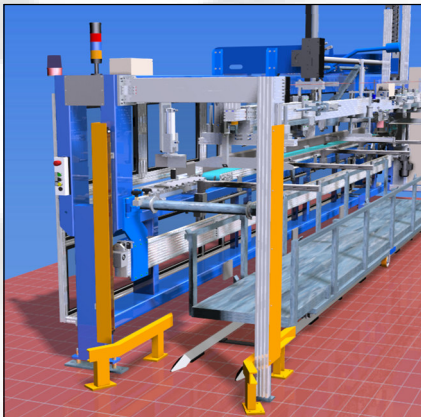
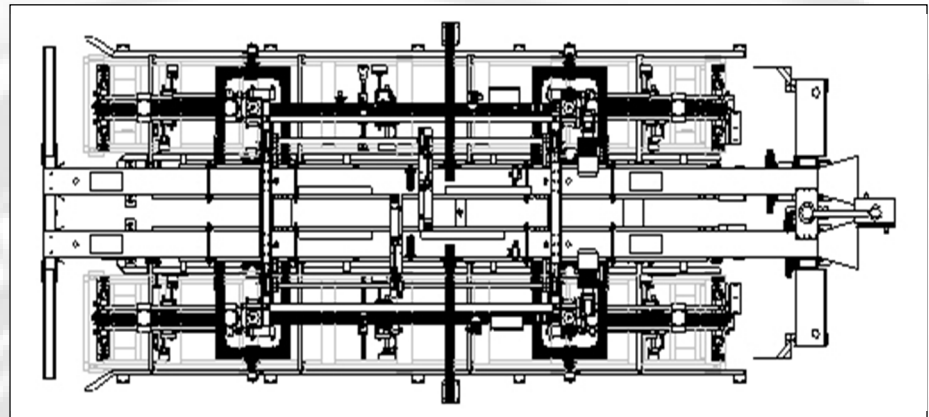


Profile stacking machine with inserted transport cassette



Outlet view



Top view of profile stacking machine for double line extrusion

### Basic information about STEIN profile stacking machines

STEIN profile stacking machines are designed so that the previously shortened production profiles cut by the traverse-cutting device of the extrusion system are deposited automatically in transport cassettes.

Brief description of the machine's function: The profiles are conveyed into the machine by a transport belt after separation from the extrudant. Depending on the required packing pattern in the cassette, each profile is turned by a rotating device (turning mechanism) to the respective position. A traverse-sliding device slides each profile perpendicular to the extrusion axis from the transport belt onto the laterally arranged support arms. The profiles are collected on the support arms until a profile layer is complete according to the cassette width. This profile layer is lifted by a gripper unit from the support arms, the support arms are swivelled to the side, and the layer is set down into the available transport cassette.

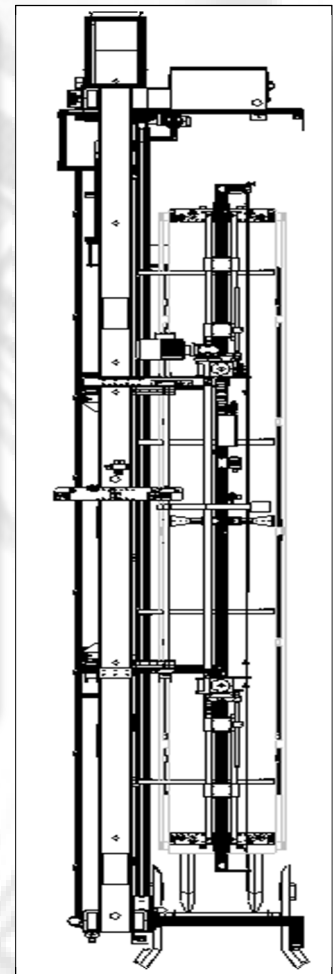
This process may be taken care of without any problems for most profile geometries. Profiles that are not independently stable due to their geometry and tend to tip are more challenging. These require additional design measures or technical program adjustments in the working process of the machine for correct handling. We have developed solutions for both over the years so that these profiles may be processed in profile stacking machines.

#### Basic mechanical layout

- With regard to the transport belts that pull the profiles into the machine, durable, enhanced woven belts with surfaces that are as smooth as possible.
- Rotating device (turning mechanism): The rotating device usually comprises a motorised toothed wheel with integrated pneumatic grippers. During the work process, the profile is gripped by the grippers on one end and lifted from the transport belt. The lifting is supported by a special device on the other end of the profile, in which case the profile length is able to be turned freely above the belt.
- The support arms consist of stainless steel profiles with profile grooves. The actual support for the profiles is pulled into the top profile groove. This support consist of PTFE sliding material and may be replaced easily in case of wear.
- The traverse slide device consists of an aluminium profile arranged on the side of the transport belt, which simultaneously acts as a lateral guide as the profiles run into the machine. The sliding movement is executed pneumatically or by a motor.
- The clamping traverse for handling the profile layers may be set for the standard version for profile lengths between 5500 and 6500 mm. The clamping jaws are laid out accordingly for handling sensitive profiles.
- Cassette fastening: To fasten the transport cassettes in the stacking area, the cassette is normally gripped by clamp grippers and the sides of the cassette are pulled outwards, provided they are stable enough to permit this. This ensures sufficient space for a secure depositing process, even if a protective film is also inserted into the cassette. Cassettes may also be gripped from underneath and fastened to a lateral guide. Both systems are often used, since different cassette systems may also be used.

#### Electrical technology

- The control panel of the machine makes it easy to read and adjust production-specific data. Normally, a simple order management for recurring production orders is already integrated. Machine settings for a certain production run, e.g. rotated pattern for profiles per layer, are added as a "package" and may be accessed again as required.
- Extended order management enables all machine settings for a product to be managed. After entering all machine parameters for a product, these are collected according to the product name as a data record and registered in the management system. If the product is produced again, then it may be selected according to its product name in the order management system, and the machine is ready for production.
- Several applications for profile stacking machines require synchronisation and data exchange with the upstream traverse cutting unit. In case of a STEIN traverse cutting unit, this communication is of course already present.
- There are a number of options for securing the stacking area. Normally, the surrounding area is monitored by safety light barrier or safety laser scanners. The option of a surrounding protective fence is also available. How the security system is finally designed usually depends on the desired handling of the cassette fitting in the stacking area and requires coordination with the future operator.



Top view of profile stacking machine



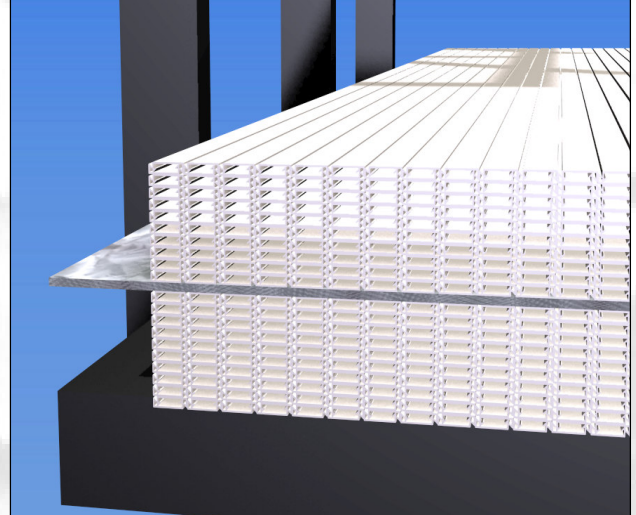
## Special machines for special handling tasks

The following is a selection of special handling machines.

### Machines for short profile lengths

In case of short profile lengths, there are usually large differences in terms of handling and the type of transport for the cassettes. These profiles are sometimes also packed as finished products directly in cartons or similar. This often also requires special nesting of the profiles among each other in order to satisfy corresponding packaging regulations.

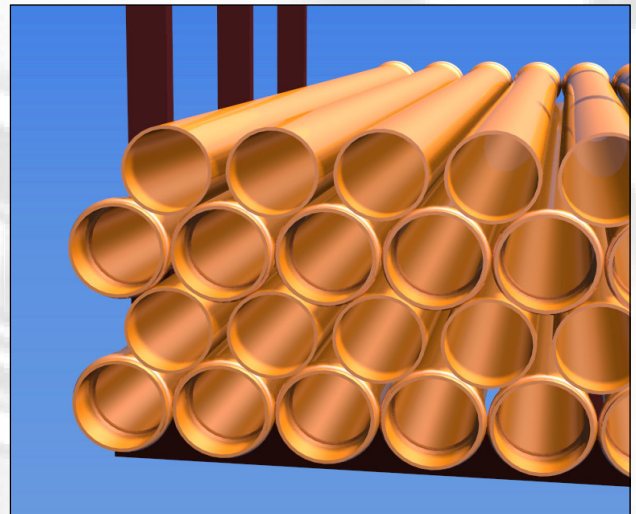
We have also developed several concepts for these applications and draw on many years of experience.



### Machines for round bars and tubes

Handling round bars and tubes represents a special application.

In this case, conveyance of profiles into the machine, positioning by gripper systems, and detailed programming to achieve special depositing patterns are important factors. Applications like attachment of end caps or similar may also be required.

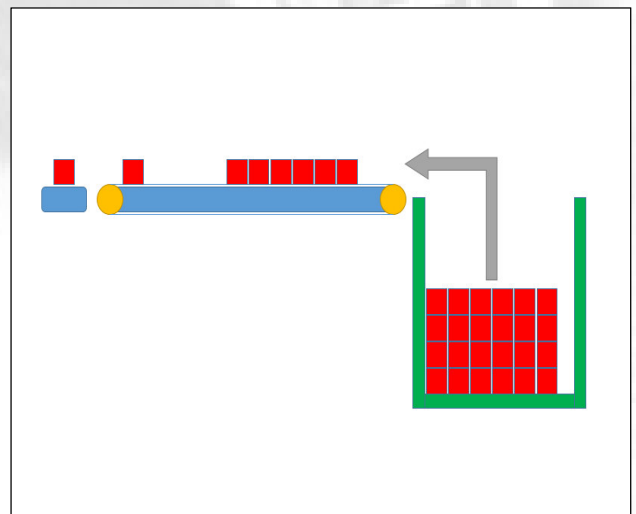


### De-stacking machines

It is also partially necessary that profiles are removed from a transport cassette again immediately to be fed to a further processing sequence. We have developed special unloading machines for this purpose.

In principle, handling works similar to loading a cassette with a profile stacking machine, just in the opposite sequence. These machines are nevertheless designed for feeding and re-aligning individual profiles for further processing.

One application, for example, is unloading profiles for feeding into a laminating system for surface lamination.

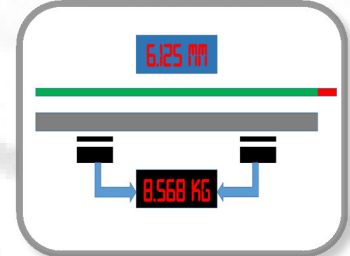


## Equipment / options / additional equipment:

The following is a selection of different options/additional equipment for profile stacking machines:

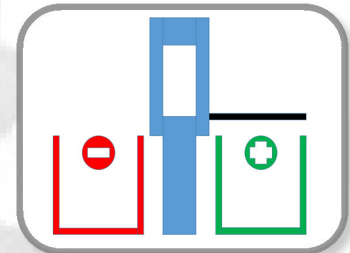
### Profile length measurement, weight detection

Length measurement systems may be installed optionally to measure the actual cut lengths in the machine. In addition to simple length detection, e.g. for control purposes, a deviation from the automatic correction of the cutting device of the extrusion system may also be used. Weight detection is also possible and can help optimise the production process via corresponding follow-up measures.



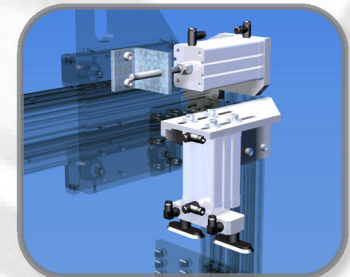
### Separation of production profiles and scrap profiles

Single line profile stacking machines can be designed so that good profiles and scrap profiles may be deposited separately. Material profiles are moved to the operator side, for example, while scrap profiles are moved non-operator side. On the non-operator side, the profiles are collected in catcher brackets or directly in provided transport cassettes.



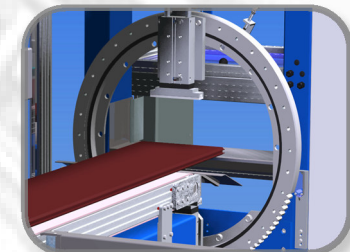
### Additional devices for profiles that are not independently stable

To handle profiles that are not independently stable, there are several options involving additional attachments that correspond with the application at hand and may be combined as needed. One example of this is support vacuums mounted on the slide device, which hold the profile after alignment by the rotation device and ensure the sliding process. This also enables special nested positioning patterns. Use of these additional attachments is often accompanied by specialisation of the machine's processing sequence.



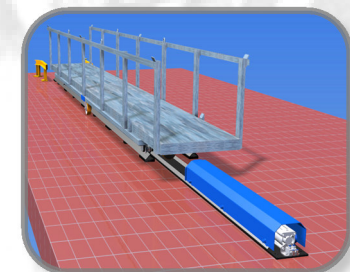
### Profile stacking machines for wide profiles

Of course, profile stacking machines may also be used for profiles like windowsill profiles or flat profiles. Usually, the modules of the machine need to be adjusted to the corresponding widths.



### Installation in the stacking area

Because the design of the transport cassettes and their internal handling can be very different, many options are available for the stacking area that need to be coordinated to achieve maximum practical utility. The cassettes are partially placed manually using sub-carriages in the stacking area, while other solutions prefer rail systems for insertion. Automatic push-in and push-out devices are also possible. In general, the cassette is fastened in the stacking area by special clamping devices, which may be adjusted to the cassette system as needed.



### Paper/film application

Paper or film layers are sometimes inserted between the profile layers. These layers may be placed automatically by the profile stacking machine. For this purpose, an application device is attached along the length of the transport cassette. A carriage featuring the paper or film roll is guided over the layer after it has been deposited, which places the insert. The insert is always guided over the layers in an S shape and then cut off after the cassette is filled completely.

