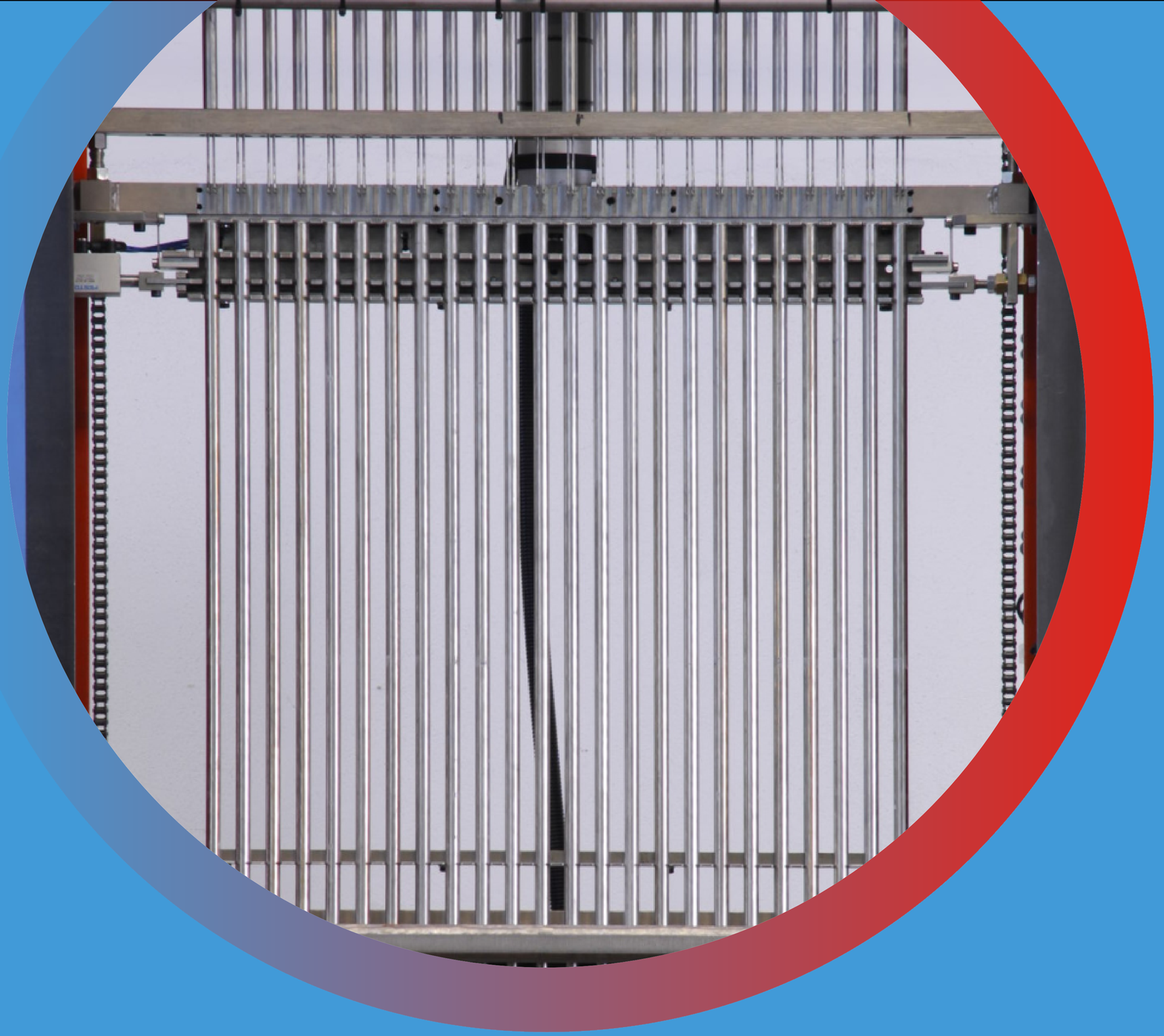
CSM MACHINERY

Filling Machine

High-speed filling machine for standard tubular heating elements.



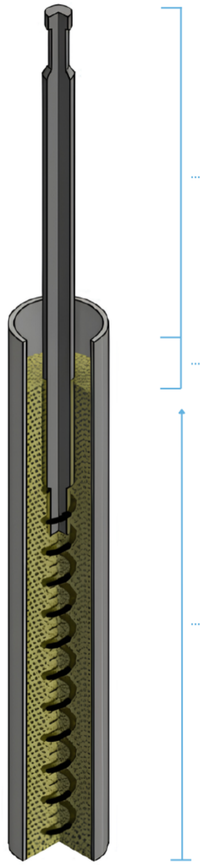
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Machine composition

- **Upper hopper,** designed to contain magnesium oxide (MgO) which will be inserted into the tubes
- **Moving hopper:** working hopper that moves together with the filling set
- **Filling set** with new-patented 3-tube system for MgO flow control, which allows for greater filling speeds. The system is fitted with a mechanical closing/opening device that not only allows higher MgO flow rates, but keeps MgO from flowing once closed.
- **Tank motorization:** motorised set up when changing the length of the tubes to be filled. Motorized adjustment of the top terminal pin protrusion from the tubes after being filled.
- **Electromechanical vibration system,** driven by a d.c. motor. The system is stable and characterized by symmetrical oscillations even when varying the vibration frequency. By changing the rotational speed of the motor, it is possible to obtain different vibration frequencies. Travelling vibrator which moves from the bottom to the top of the tube during the filling process.
- **Adjustable bottom bar for tube support,** easily adjusted from the panel to accommodate different lengths of tubes to be filled.
- **Control panel** facilitates intuitive operation and allows for quick setting and control of the main machine functions.



Filling and adjustments



Top terminal pin protrusion
Distance by which the upper terminal pin protrudes from the tube after filling.
Adjustable from **15 to 35 mm.** The adjustment is motorised and made from the control panel, so the pin length can be changed without handling the tubes. Changeover time: 1-2 min.

Clearance on the upper part of the tube
Free length left at the top of the tube, between the MgO level and the tube end. It is adjustable, so the same machine can leave the clearance each element design requires.

Constant MgO density
The travelling vibrator moves from the bottom to the top of the tube during filling, so the oxide is compacted evenly along the whole length. The d.c. motor gives symmetrical oscillations; changing its rotational speed sets the frequency, **adjustable from 0 to 60 Hz.**

ADJUSTMENTS AT A GLANCE

Adjustment	Range	Changeover
Top terminal pin protrusion	15-35 mm	1-2 min
Tube length (bottom bar for tube support adjusted from the panel)	min 300 mm up to 3000 mm; min 350 mm above 3500 mm	2-4 min
Tube diameter	see available versions	5 min
Vibration frequency	0-60 Hz, by motor speed	continuous
Number of tubes to be filled	programmable versions: set by electrical switches	at setting

The filling speed (up to 600 mm/min) may be lower depending on the materials and the geometry of the element to be filled.

Filling system

The patented three-tube magnesium oxide filling system is designed to achieve high filling speeds, improve filling quality, and prevent material leakage at the end of the cycle.
The concentric tube configuration also helps reduce wear on components in contact with the magnesium oxide, increasing the system's reliability and service life.

Components and Operation

1. First Tube (Inner Tube)

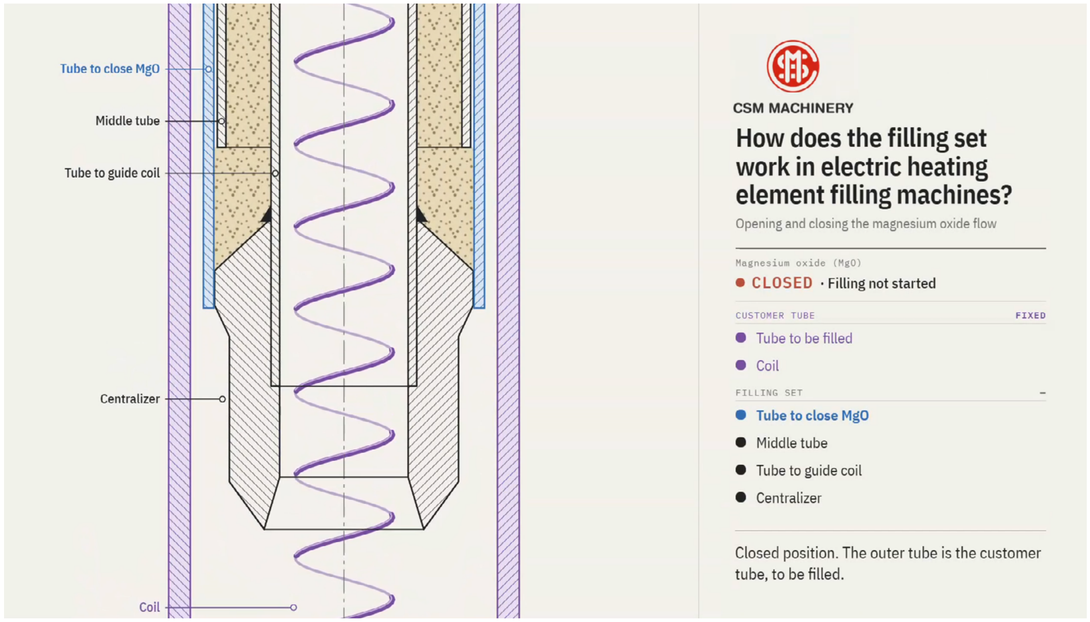
The first tube, positioned at the center of the system, is equipped with a tungsten-carbide centering head soldered to its end, which guides the heating element coil throughout the entire filling phase.
The centering head, fitted with support fins, keeps the coil perfectly aligned with respect to the tube being filled, while also ensuring sufficient clearance for the magnesium oxide to flow outward.

2. Second Tube (Intermediate Conveying Tube)

The second tube is the channel through which the magnesium oxide actually flows. It directs the material into the tube being filled, ensuring a steady and consistent flow.

3. Third Tube (Shut-off Tube)

The third tube acts as an opening and closing valve for the magnesium oxide flow.
Separating the shut-off tube from the conveying tube helps limit wear on the component exposed to the magnesium oxide, while ensuring complete closure of the channel at the end of the cycle. This design eliminates leaks and accidental discharge of material.



WATCH THE VIDEO

Technical characteristics

Adjustment of top terminal pin protrusion	15-35 mm
Diameter of tubes to be filled	see available versions
Max. length of tubes to be filled	see available versions
Min. length of tubes to be filled (filling length up to 3000 mm)	300 mm
Min. length of tubes to be filled (filling length > 3500 mm)	350 mm
Number of tubes to be filled	30-24-15
Filling speed up to*	600 mm/min
Vibration intensity (frequency)	adjustable from 0 to 60 Hz
Installed electric power	3 kW
Power supply	V to be defined
Pneumatic supply	6 bar
Set up time when changing the length of the tube to be filled	from 2 to 4 min.
Set up time when changing the extension of the terminal pins	1-2 min.

* The speed may be lower depending on the materials and the geometry of the element to be filled.

600
mm/min
filling speed, up to

0-60
Hz
vibration frequency

30-24-15
tubes
per machine, by diameter

3
kW
installed power

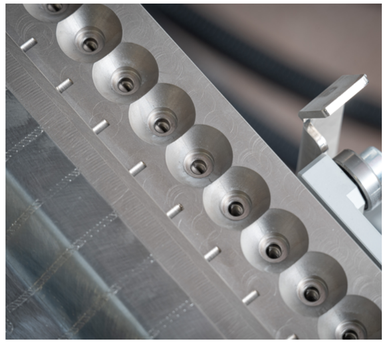
Options

LOWER PIN LOCKING AND COIL STRETCHING UNIT

Replacing the standard bottom bar of the filling machine, this unit precisely locks the lower terminal pins in their reference stations, each with its own push-button anchoring system. It has two main functions:

- **Secure pin fixing:** prevents the pin from pulling out of the bottom plug with large-diameter wire or double/triple coils, which apply high tension on the plug.
- **In-machine coil pre-stretching:** where pre-stretching is required, the coil is stretched directly in the machine, with no need for a dedicated pre-stretching machine.

Lower pin protrusion from tube end	min 18 mm; max 40 mm
Lower pin protrusion, oxide collection tray removed	max 60 mm
Pin anchoring control	push-button, side of machine

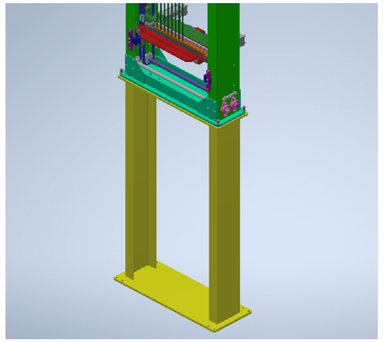


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SPACER ELEMENT FOR FILLING MACHINES

Dedicated spacer, designed to raise the filling machine to a predefined height level.

Mod. 135/00.000010	max spacer length 2000 mm
Mod. 135/00.000020	max spacer length 4000 mm
Mod. 135/00.000030	max spacer length 6000 mm



Options

HEATING SYSTEM FOR MgO HOPPER

All filling machines include the MgO hopper. This option adds the heating system: a stainless steel hopper heated by an etched foil heater, designed to keep the magnesium oxide dry and free-flowing and to feed it regularly into the filling system.

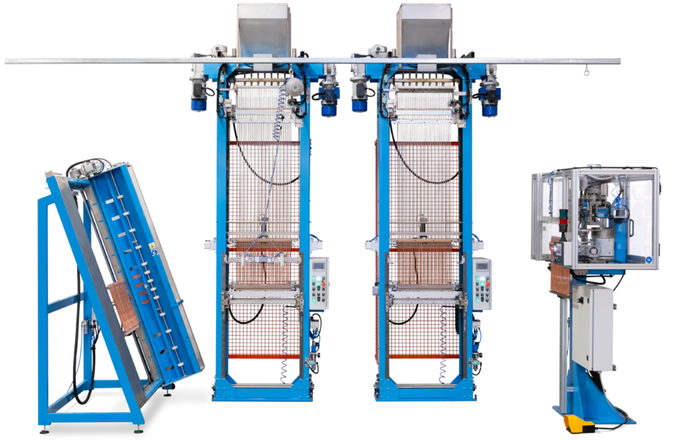
- **Etched foil heater:** heats the hopper walls and the oxide inside.
- **Temperature probe** inside the hopper, for thermostatic control of the heating.
- **Separate thermostat** placed near the machine control panel, with its own power supply: the oxide heating can stay on even when the machine is switched off.
- **Anti-caking function:** keeping the hopper heated prevents the magnesium oxide from caking under unstable ambient conditions, such as high humidity.
- **Consistent oxide flow:** the oxide stays loose and free-flowing, ensuring regular feeding of the filling system.



FILLING AUTOMATION

A set of machines and equipment that automates the entire filling process, from tube preparation to unloading of the filled heating elements. Designed for seamless integration with the filling machine and the other equipment on the production line, it ensures a continuous workflow with shorter cycle times and fewer manual operations.

- **Tube presetter:** prepares and positions the tubes for the filling cycle.
- **Plug up unit:** automatically fits the upper plugs onto the filled heating elements.
- **Clamp:** handles and transfers the heating elements between the stations.



Available versions

The filling machines are available in two versions:

- **non-programmable** filling machine for simultaneous filling of tubes
- **programmable** filling machine with the possibility to set the number of tubes to be filled. The setting of the number of tubes to be filled is done by means of electrical switches

The filling machines can be designed to fill one diameter, or to fill more than one diameter.

Set up time when changing the diameter to be filled: 5 min.

30-TUBE FILLING MACHINES FOR TUBE DIAMETER 7,5 TO 10 MM

max tube length	1 diameter non-programmable	1 diameter programmable	2 diameters programmable	3 diameters programmable
1000 mm	135/30.100000	138/30.100000	138/31.100000	138/32.100000
1500 mm	135/30.150000	138/30.150000	138/31.150000	138/32.150000
2000 mm	135/30.200000	138/30.200000	138/31.200000	138/32.200000
2500 mm	135/30.250000	138/30.250000	138/31.250000	138/32.250000
3000 mm	135/30.300000	138/30.300000	138/31.300000	138/32.300000
3500 mm	135/30.350000	138/30.350000	138/31.350000	138/32.350000
4000 mm	135/30.400000	138/30.400000	138/31.400000	138/32.400000
4500 mm	135/30.450000	138/30.450000	138/31.450000	138/32.450000
5000 mm	135/30.500000	138/30.500000	138/31.500000	138/32.500000
5500 mm	135/30.550000	138/30.550000	138/31.550000	138/32.550000
6000 mm	135/30.600000	138/30.600000	138/31.600000	138/32.600000

24-TUBE FILLING MACHINES FOR TUBE DIAMETER 10,1 TO 14 MM

max tube length	1 diameter non-programmable	1 diameter programmable	2 diameters programmable	3 diameters programmable
1000 mm	134/24.100000	133/24.100000	134/31.100000	134/32.100000
1500 mm	134/24.150000	133/24.150000	134/31.150000	134/32.150000
2000 mm	134/24.200000	133/24.200000	134/31.200000	134/32.200000
2500 mm	134/24.250000	133/24.250000	134/31.250000	134/32.250000
3000 mm	134/24.300000	133/24.300000	134/31.300000	134/32.300000
3500 mm	134/24.350000	133/24.350000	134/31.350000	134/32.350000
4000 mm	134/24.400000	133/24.400000	134/31.400000	134/32.400000
4500 mm	134/24.450000	133/24.450000	134/31.450000	134/32.450000
5000 mm	134/24.500000	133/24.500000	134/31.500000	134/32.500000
5500 mm	134/24.550000	133/24.550000	134/31.550000	134/32.550000
6000 mm	134/24.600000	133/24.600000	134/31.600000	134/32.600000

Available versions

15-TUBE FILLING MACHINES FOR TUBE DIAMETER 14,1 TO 19 MM

max tube length	1 diameter non-programmable	1 diameter programmable	2 diameters programmable	3 diameters programmable
1000 mm	135/15.100000	138/15.100000	135/32.100000	135/33.100000
1500 mm	135/15.150000	138/15.150000	135/32.150000	135/33.150000
2000 mm	135/15.200000	138/15.200000	135/32.200000	135/33.200000
2500 mm	135/15.250000	138/15.250000	135/32.250000	135/33.250000
3000 mm	135/15.300000	138/15.300000	135/32.300000	135/33.300000
3500 mm	135/15.350000	138/15.350000	135/32.350000	135/33.350000
4000 mm	135/15.400000	138/15.400000	135/32.400000	135/33.400000
4500 mm	135/15.450000	138/15.450000	135/32.450000	135/33.450000
5000 mm	135/15.500000	138/15.500000	135/32.500000	135/33.500000
5500 mm	135/15.550000	138/15.550000	135/32.550000	135/33.550000
6000 mm	135/15.600000	138/15.600000	135/32.600000	135/33.600000

CUSTOM SOLUTIONS

Need larger diameters or lengths? Our filling machines can be adapted to your specific needs.

Contact our sales team to discuss your requirements and get a quote.

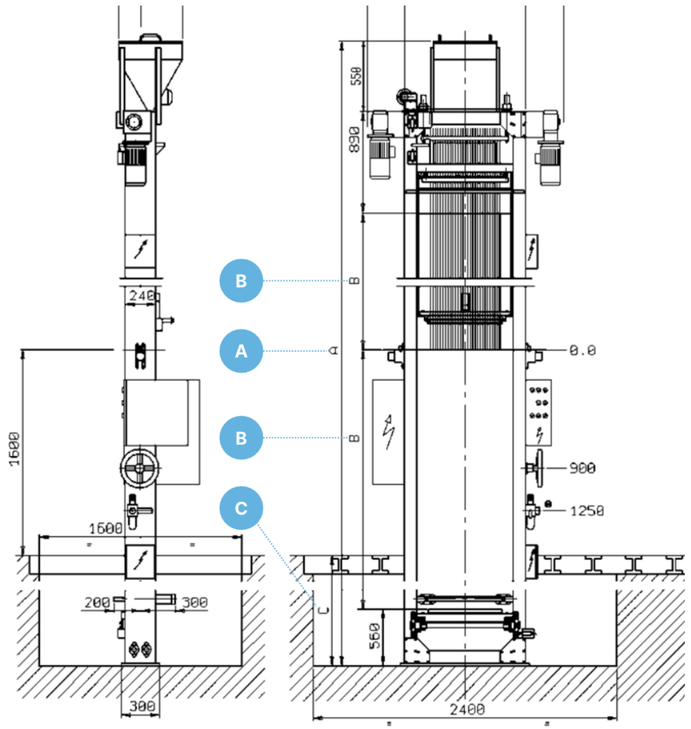
SPECIAL 30-TUBE FILLING MACHINE FOR MICROTUBE - DIAMETER 5,1 TO 7,2 MM

Unlike the standard filling machines (for diameters starting from 7,5 mm), the microtube filling machine system is fitted with a mechanical opening/closing device to open and then close the flow of MgO from the start of filling. Since the tube to be filled is too small to fit three filling tubes, it is necessary to use only two tubes with a device that closes the flow of MgO.

This system guarantees the same filling speed rates (600mm/min) as the CSM filling system with three tubes.

max tube length	1 diameter non-programmable	1 diameter programmable	2 diameters programmable
1000 mm	035/30.100000	038/30.100000	036/31.100000
1500 mm	035/30.150000	038/30.150000	036/31.150000
2000 mm	035/30.200000	038/30.200000	036/31.200000
2500 mm	035/30.250000	038/30.250000	036/31.250000
3000 mm	035/30.300000	038/30.300000	036/31.300000

Layout



TUBE LENGTH	A	B	C
6000 mm	14000 mm	6000 mm	4960 mm
5500 mm	13000 mm	5500 mm	4460 mm
5000 mm	12000 mm	5000 mm	3960 mm
4500 mm	11000 mm	4500 mm	3460 mm
4000 mm	10000 mm	4000 mm	2960 mm
3500 mm	9000 mm	3500 mm	2460 mm
3000 mm	8000 mm	3000 mm	1960 mm
2500 mm	7000 mm	2500 mm	1460 mm
2000 mm	6000 mm	2000 mm	960 mm
1500 mm	5000 mm	1500 mm	460 mm
1000 mm	4000 mm	1000 mm	---

NOTES: We recommend allowing an additional 500 mm above the upper hopper for loading the MgO powder.

Filling machine with vertical motorization

When to choose it

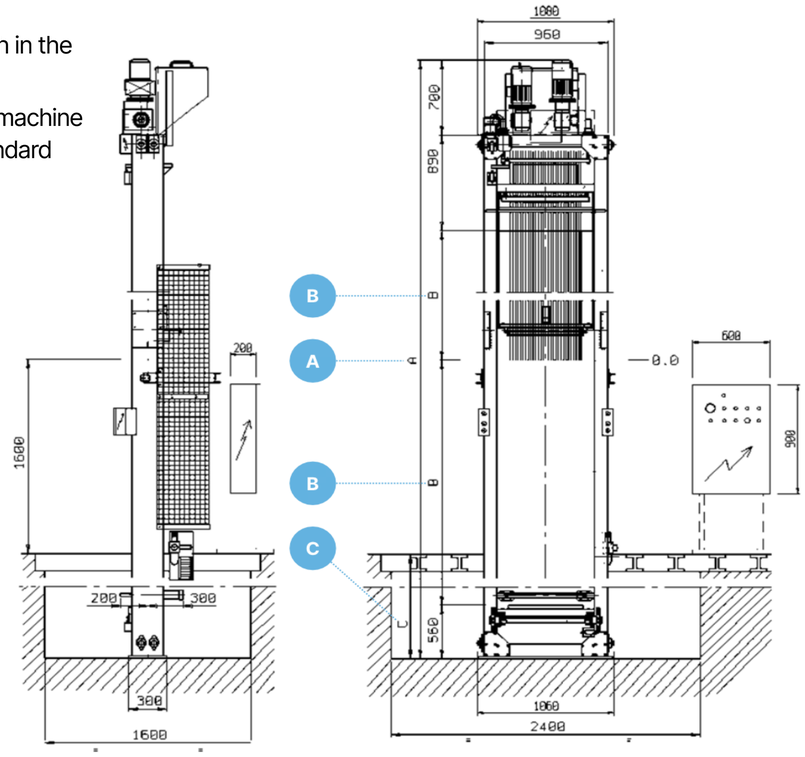
The vertical motorization version is required when the installation area limits the width in the upper part of the machine, where the gearmotors are located.

It allows a filling machine to be installed in areas of limited width where the standard machine would not fit: maximum width 1100 mm, against about 1560 mm at the top of the standard machine (960 mm + 2 × 300 mm in the layout drawing).

Main features

- The number of tubes to be filled is set by means of appropriate electric drives
- The protection tubes must be assembled onto the non-working stations
- Set up time when changing the diameter to be filled: 5 min.

Tubes	Diameter	Code (programmable, 1 diameter)
30	7,5 - 10 mm	138/38.XX0000
24	10,1 - 14 mm	134/35.XX0000
15	14,1 - 19 mm	135/34.XX0000



TUBE LENGTH	A	B	C
6000 mm	14150 mm	6000 mm	4960 mm
5500 mm	13150 mm	5500 mm	4460 mm
5000 mm	12150 mm	5000 mm	3960 mm
4500 mm	11150 mm	4500 mm	3460 mm
4000 mm	10150 mm	4000 mm	2960 mm
3500 mm	9150 mm	3500 mm	2460 mm
3000 mm	8150 mm	3000 mm	1960 mm
2500 mm	7150 mm	2500 mm	1460 mm
2000 mm	6150 mm	2000 mm	960 mm
1500 mm	5150 mm	1500 mm	460 mm
1000 mm	4150 mm	1000 mm	---

NOTES: We recommend an additional 500 mm above the primary hopper for loading the MGO powder in the primary hopper.