



# BE TOWER

BE INDUSTRIOUS



F A Y A T M I X I N G P L A N T S



# BE TOWER

The new generation of BE TOWER batch plants, which can produce as much as 160 tph, is MARINI's answer to market demand.

The BE TOWER, designed and entirely produced in Italy, exemplifies modern technology with great performance at an extremely attractive price.







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# What makes the plant unique

## EVOLUTION

### **A compact plant which performs well**

The original compact design means optimum site organization. And to the competitive purchase price we can add reduced working / management costs plus low costs of transfer, erection and maintenance.

## EASY TRANSPORT

### **...in total safety**

BE TOWER underlines the importance of transportability, with its containerised modules which make transfer not only quicker, simpler and cheaper, but also much more secure. All the component parts are protected from atmospheric degradation, risks of accidental damage and theft.





## QUICK ERECTION

### Quick installation and rapid profits

BE TOWER distinguishes itself for its quick assembly and dismantling, made possible by the pre-cabling of the electrics for each module, together with the innovative design of the drum/filter unit which allows a almost total integration of the parts.

## ESSENTIALITY AND TECHNOLOGY

### Simple and functional

This is the perfect plant for clients who need to produce asphalt and complete the laying operations in the shortest time possible, wherever the delivery site location may be. The modular design, even in its basic version, provides all the necessary fundamentals for managing and producing asphalt mixes. In addition, at any later date, extra metering systems can be integrated for all types of additive, high percentages of RAP into the mixer, plus modern warm mix asphalt kits.

## SIMPLE TO USE AND MAINTAIN

### Simple to use and comfortable spaces for easy maintenance

Conceived to minimize training time of operators and staff on site, BE TOWER is easy to use and hard working round the clock. It is built with care and entirely manufactured in Italy with high quality, long-lasting materials for constant work regimes.





# Evolution

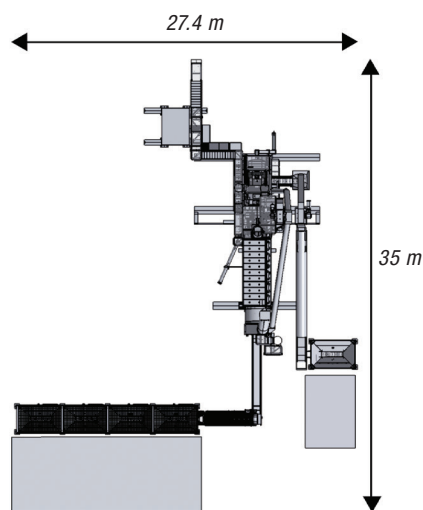
*The original compact design means optimum site organization. And to the competitive purchase price we can add reduced working / management costs plus low costs of transfer, erection and maintenance.*

The dryer-filter tower optimizes the fines / gas / heat recovery circuits, with consequent reduction in fuel consumption and electric power. The underlying basic concept of this type of plant is substantial energy savings and significant reduction of CO<sub>2</sub> emissions into the atmosphere.

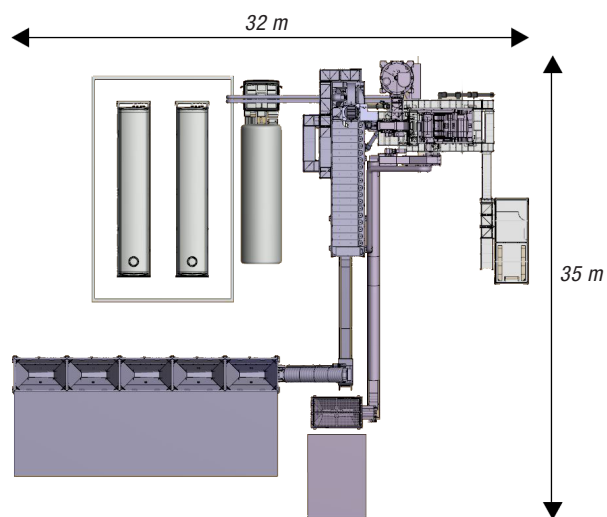
The mixing tower is designed to have cladding for sensitive sections, to further reduce heat dispersion. Thanks to its limited ground space, the BE TOWER

can be easily integrated into its surrounding area. Compared to a traditional asphalt plant, with component parts situated on the ground, there can be as much as 40% reduction in ground space.

All MARINI plants are designed for reduced energy consumption, which means a significant reduction in production costs and consequent return on investments for clients.



BE TOWER 1500 lay-out



BE TOWER 2000P lay-out



The 120 tph BE TOWER 1500 is shown with its characteristic layout: the dryer-filter bar in line with the mixing tower, as opposed to the 90° position of the other BE TOWERS.

This is possible thanks to the reduced dimensions and the desire to further facilitate transport, by having complete modules to fit inside the container: e.g. the recovered fines hopper is in line with the mixer and can be moved as a single connected unit.

This plant is a true representation of technology and innovation. Even the smallest detail is the result of a long, accurate study of ergonomics, practicality of transport, installation and maintenance, easy use and great performance.







## Quick plant erection

*BE TOWER can be erected and dismantled in record time thanks to several specific expedients for improving rapidity and efficiency.*

The speed of plant erection is made possible by several factors:

- pre-cabling of electrics on the modules, tested and inspected before shipment
- all electric cables connecting modules to the control cabin are fed into external cable trays, making underground trays unnecessary

Other factors, associated with the drum-filter unit, which also aid erection operations are:

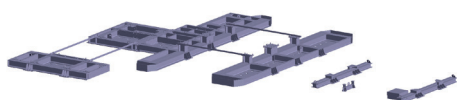
- reduced ground requirements
- no screw conveyors on ground
- fumes duct integrated into modules (dryer/recovered fines hopper/bag filter) is very short and insulated

- fumes stack is located above the filter, on the highest part of the unit, and not on the ground with the benefit of fumes emissions above the highest part of the plant

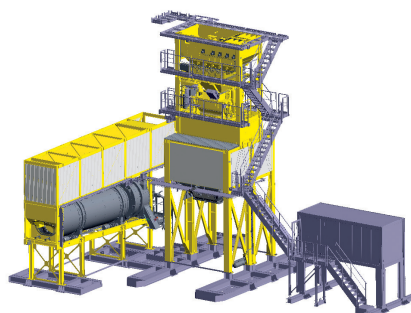
It is also possible to have metal bases for the entire plant. In this way expensive and lengthy civil works to create a cement platform can be avoided. Also the MARINI plant can be subsequently transferred to other sites in the shortest possible time and at the lowest possible costs.



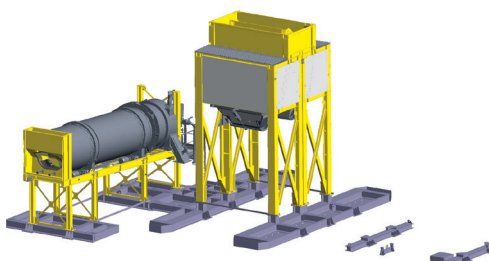
## Sequence of erection



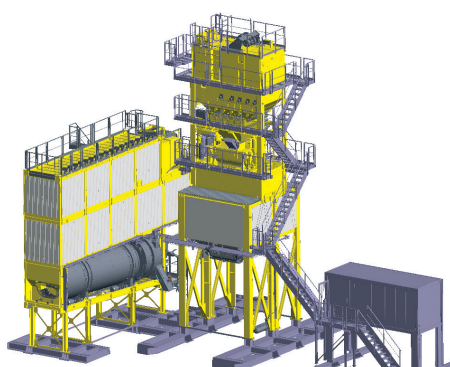
1 - metal foundations (optional)



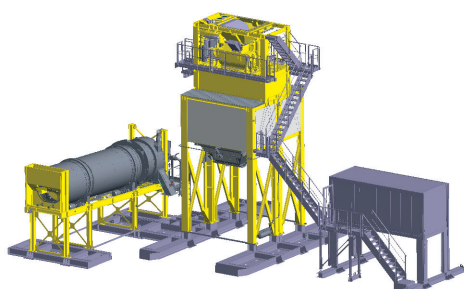
4 - recovered fines hopper and under-screen hopper



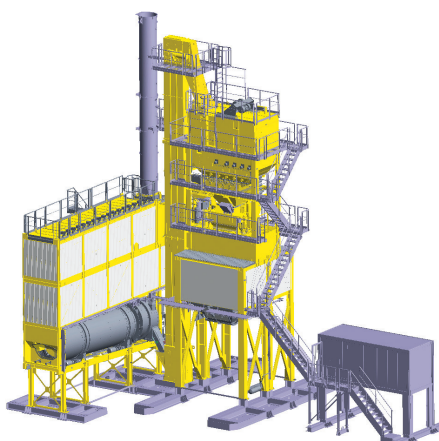
2 - dryer drum and storage bin



5 - filter and screen



3 - mixer and control cabin

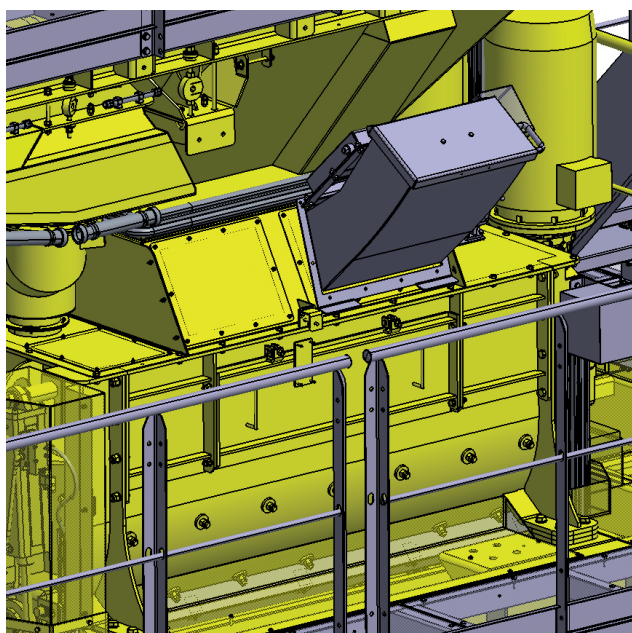


6 - hot elevator and stack



# Essentiality and technology

*Simple and functional: the perfect plant for clients who need to produce asphalt and complete laying operations in the shortest time possible, wherever the delivery site location may be.*



*Additive metering in sacks*

## **Module system**

The modular design, even in its basic version, provides all the necessary fundamentals for managing and producing asphalt mixes. It is perfect for clients wanting an up-to-date plant without forfeiting the reliability and the advantages typically associated with traditional plants.

## **Easily updated**

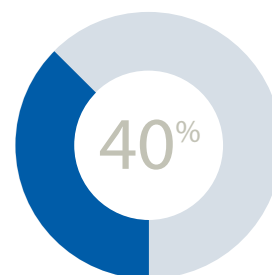
At any moment in time, BE TOWER can be updated to meet a variety of challenges in the work place and upgraded with modern technical solutions:

- fitting of additive metering systems. (liquid or solid, granular or pellets)
- installation of a KIT to allow the production of warm asphalt, a very high quality mix at temperatures 20-30° C lower than traditional warm mixes.

The new equipment has been developed from the experience of the FAYAT Group in this specific technology working with the most important companies in the sector.



*Kit for warm asphalt*



### RAP management and metering system

Everyone, from road engineers to asphalt producers, is searching for ways of using higher percentages of RAP, not just for environmental reasons but also to substantially reduce production costs thanks to the lower consumption of bitumen and virgin aggregates. Nowadays, adding a percentage of RAP into the final mix has become an unavoidable procedure in the western world, and is fast becoming of increasing interest in the developing world too. BE TOWER has been designed so that it can be fitted quickly and cheaply with a recycling line into the mixer.

The RAP material is fed from a separate feeder onto a belt and then into a bucket elevator which discharges into a hopper and onto a belt (part of which is placed on a special weigh bridge), before being fed into the mixer. The vapour created in the mixer when the cold RAP comes into contact with the hot aggregates must be released. This is the reason why BE TOWER has been designed with spaces where exhaust ducts can be fitted.

Thanks to this solution the virgin aggregates can be screened, given that the RAP follows a different circuit to the virgin aggregates. The recycling percentage can easily reach 40%.



*RAP chute into mixer*





## Simple to use and maintain

*BE TOWER is simple to use and has comfortable spaces for careful, quick and completely safe maintenance operations.*

BE TOWER is an easy to use plant and guarantees a hard-working performance on a day-to-day basis. It is built with care and manufactured with high-quality, long-lasting materials for constant work regimes.

### **Comfort is the key-word**

BE TOWER is designed for the client who lives with the plant on a day-to-day basis. Ample access to all parts means better safety and rapidity in maintenance operations. Recent deposited patents offer quick replacement of screen meshes and SMART WIRING technology allows rapid implementation of electric procedures from the cabin.

### **Wear resistant**

The aim is clear: lengthen the average life span of the components and reduce the impact of ordinary maintenance. BE TOWER has a mixer fitted with wear-resistant arms and paddles. The symmetrical flights make mixing uniform and reduce wear on the parts that come into contact with the aggregates. The plates made from special anti-wear material are bolted to the lower part of the mixer and offer a highly resistant shield and allow speedy maintenance operations.



## Easy transport

*The BE TOWER project was born out of the need to create a plant which could be transported to any worldwide destination in total security. The concept of transportability is made easy through the plant's system of modules, which can easily be inserted into standard high cube containers, and afterwards rendered to the shipper, stored or resold.*

The use of containers has the following advantages:

- quick and easy transfer on any type of truck, train or ship for worldwide delivery in the shortest time possible
- low transport costs, with up to 70% reduction compared with similar standard component
- safe transport, with all the parts protected against atmospheric agents (damage in case of transfer by sea), accidental damage caused by unwarranted movement and theft of component parts





# Dryer-filter unit

*The filter is positioned directly above the dryer, which rationalizes the flow of gas and materials that require filtering. Ground space is optimized to allow good traffic circulation and refuelling operations.*



## Highly efficient dryer drum

- the dryer drum is made from special steel and saw welded
- the length of the cylinder, the velocity of the gases, the form and position of the paddles are optimized to grant adequate heat transfer and a low level of energy consumption
- a probe placed on the discharge chute guarantees constant control of aggregate temperature
- the aggregate discharge chute is protected by wear resistant plates (on request)
- the highly resistant stainless steel flight system is bolted to make maintenance interventions easier
- 4 motor operated systems command the start-up
- quick and easy conformance of the drum with external screw adjustments
- external cladding with aluminium sheet on dryer drum; rock wool insulation (on request)

## Burner

The burner dryer unit is designed to provide high thermal yield by optimizing fuel consumption and limitation of CO<sub>2</sub> emissions.

Its characteristics are:

- simple, reliable and efficient closed burner
- automatic operation of lighting and regulation of heat, on the basis of the temperature of the aggregates discharged from dryer
- automatic start-up and heat-regulation operations, depending on temperature of aggregates discharged from mixer
- suitable for all types of fuel on the market: diesel oil, heavy fuel oil, natural gas, coal dust
- mechanical/electronic control of air/fuel ratio

## Gas filtering

The high performance filter system together with an adequate fines storage system mean that the environmental regulations can be fully respected while a high-quality final product can also be obtained.

The combustion gases in the drum are transferred to the filter connected to the dryer, together with the fines. These gases reach the bag filter which filters the recovered fine material and discharges only clean air. The automatic cleaning of the bags with counter-flow air causes the fines to detach and fall through gravity.

## Safety

Special attention is paid to safety, especially nowadays when plants produce special asphalts, such as RAP mixes. A double control at the filter entrance leads to the burner being turning off should the temperature be too high. The system can also be fitted with fresh air devices, on request, as a further safety measure.

## Pre-separator

A pre-separator can be integrated into the filter (optional) to separate out the oversize fines, which can then be fed directly into the hot aggregate elevator.

## Recovered fines circuit

Two different solutions are adopted depending on the position of the finished product storage bins, which can be on the side of or underneath the mixer:

- in the first case the recovered fines are fed directly from the storage bin, located under the filter, to the weigh hopper via a screw conveyor
- in the second case, the recovered fines are fed from the storage hopper to a surge hopper via an elevator, then later transferred into the weigh hopper via a screw conveyor (not valid for BE TOWER 1500)





# Mixing tower

*Correct screening and precise metering are essential requirements for asphalt production. Comfortable points of access in the various tower modules allow easy maintenance interventions.*



## Hot elevator

- for feeding aggregates from dryer drum to the screen
- self-adjusting belt tension (with counterweights)
- sealed chain tension system
- double chain (marine) operation, easy maintenance (option single roller chain)
- safe and easy maintenance at foot of elevator

## Vibrating screen

- 4,5 or 6 screens depending on model
- completely bolted frame
- automatic adjustment of mesh tension
- external mounted vibrators for easy maintenance
- all screens factory tested for upwards of 24 hours

## Under screen storage

- one or more models with variable capacity, depending on production requirements
- by-pass stored in sand hopper

## Bitumen metering

The bitumen metering allows the type of binder to be quickly changed, with no loss of material.

The weigh hopper is mounted on load cell for maximum precision. It is emptied by an electrically heated throttle, operated by an electro-pneumatic jack.

### Additive metering

The mixer is set up for use with any kind of additive in various bag sizes, which means that all types of asphalt mixes can be produced. (modified bitumen, warm mixes, etc.)

### RAP metering into mixer

Before entering the mixer, the material is weighed on a belt placed on weigh cells.

To allow the expulsion of the water vapour which forms when the RAP is fed into the mixer, the plant is fitted with specially designed pipes connecting to the bag filter.

### Aggregate and fines metering

Both the aggregates and fines/filler are metered on special scales.

### Mixer

The system of double shaft mixer operation consists of two gear motors directly coupled to the shafts with metal-bracket synchronized coupling. The arms and paddles are honeycomb shaped for the longest wear resistance.

### Maintenance

- bolted-on arms and paddles are easily replaced
- simple greasing of mixer on individual points
- safe and easy access for maintenance
- direct motorization, without transmission belts





# Cold feeders

*The cold feeders are used for storing virgin aggregates making up the grading curve before the drying stage.*



The feeders proposed for the BE TOWER containerized unit consists of a set of independent modules, with the following features:

## Hoppers

- basic capacity/width:
  - 18m<sup>3</sup> / 3.500mm
  - 24m<sup>3</sup> / 3.500mm
- the number of bunkers according to the customer's needs

## Extractor belt

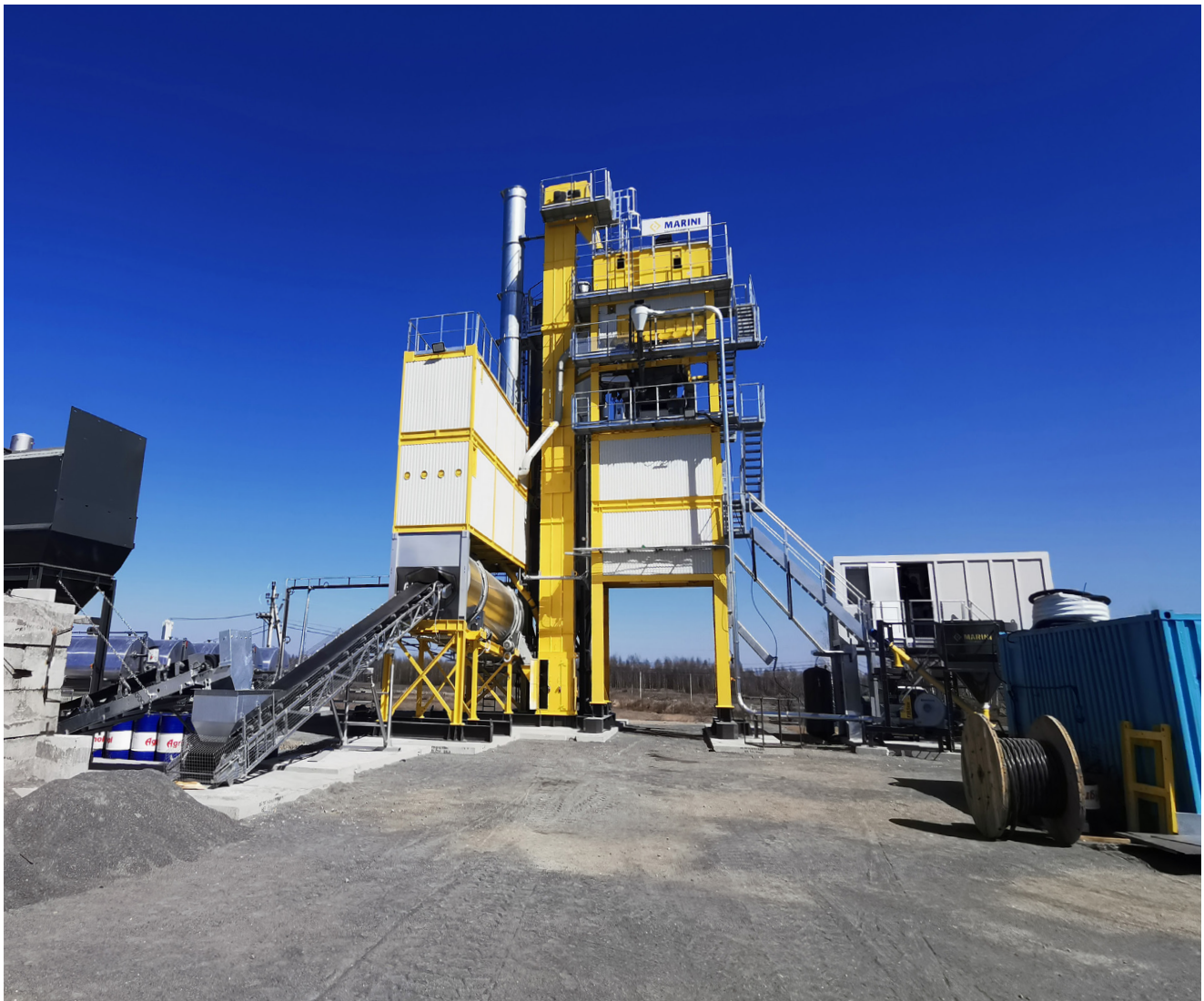
- volumetric metering
- capacity up to 210 tph

## Specifications

- presetting extractor production
- adjustment, control and synchronization of extractor capacity
- LED indicating extractor operation and need to reload hopper
- reduced loading height
- protection grills

## Storage bins

*The plant can be easily fitted for storage under the mixer or on the side.*





# Binder storage

*The binder storage has been designed to allow the tanks to be filled in total safety.*

The tanks can be vertical or horizontal, with electric or hot oil heating, and can store all types of binder: normal, modified or synthetic bitumens. They can also be designed to simplify transport and reduce costs by introducing a standard 40' high cube container.

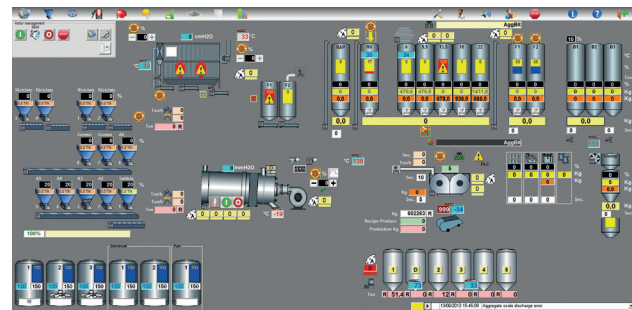


# Plant management

*The coordination of production efficiency together with plant maintenance and safety must be guaranteed by an adequate management system - the new MARINI Cybertronic system.*

**Ergonomics, safety and ecology in the simplest of control methods:**

- Integrated Diagnostic System (IDS) for a quick and simple identification of possible procedural errors
- innovative graphic design, easy to understand, real time plant visualization
- wide range of operational languages which can be customized
- client training programme for improved competency
- dual monitor control system (upon request)



**Plant components management:**

- **production planning:** automatic production cycle planning for optimum results
- **maintenance module:** automatic non-stop management of maintenance activities of individual components
- **calibration management system:** specific integrated system for efficient calibration of plant components and extractors
- **binder park management system:** control of loading, storage and decanting to ensure the product's total integrity
- **WMA production management:** automatized management module for WMA production with foaming system
- **CYB-R@P module:** automatic RAP and virgin material modification with regard to customer requirements
- **interface with weigh bridge:** weighing operations automatically connected to planning operations

**In addition:**

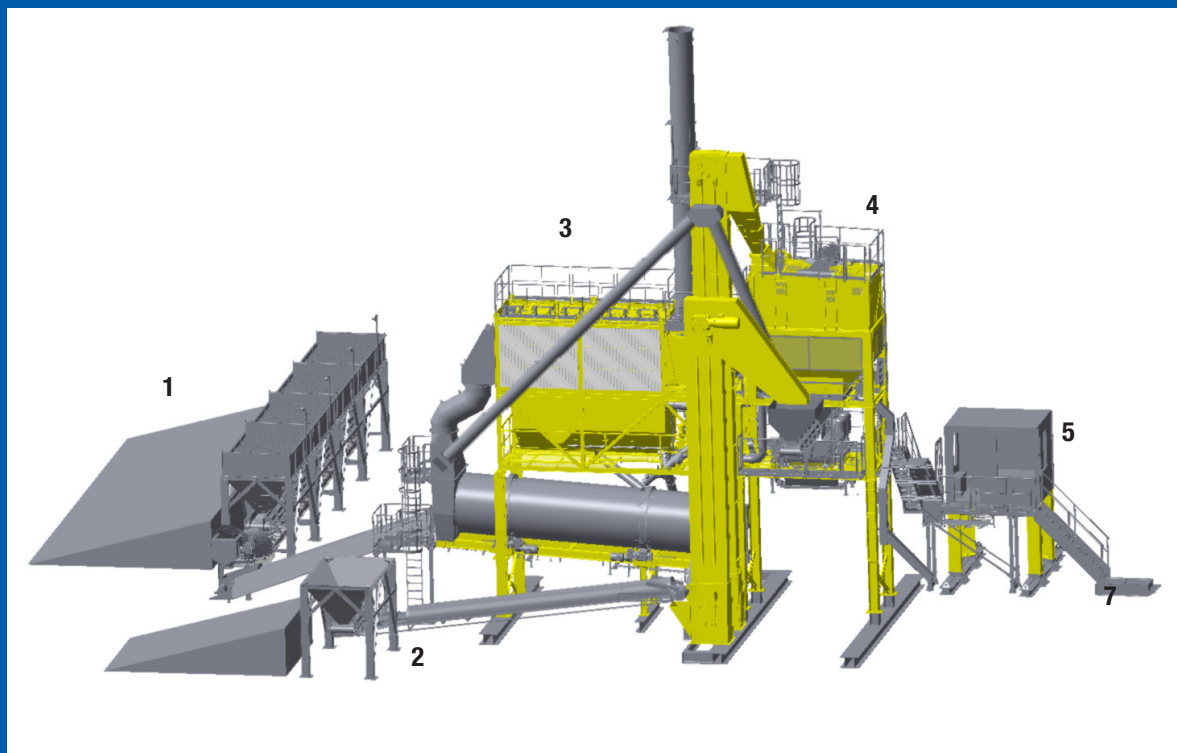
- **CYB-SAVE module:** control system for containing energy consumption and limiting environmental footprint
- **geo-tracking system:** accurate geo-location of customer system of logistics
- **worldwide online service:** remote connection to MARINI plants with 24/7 hotline support for rapid technical intervention





# Plant lay-out

## BE TOWER 1500



**1** storage and metering of virgin aggregates

**2** storage and metering of recycled materials

**3** drying-filtering unit

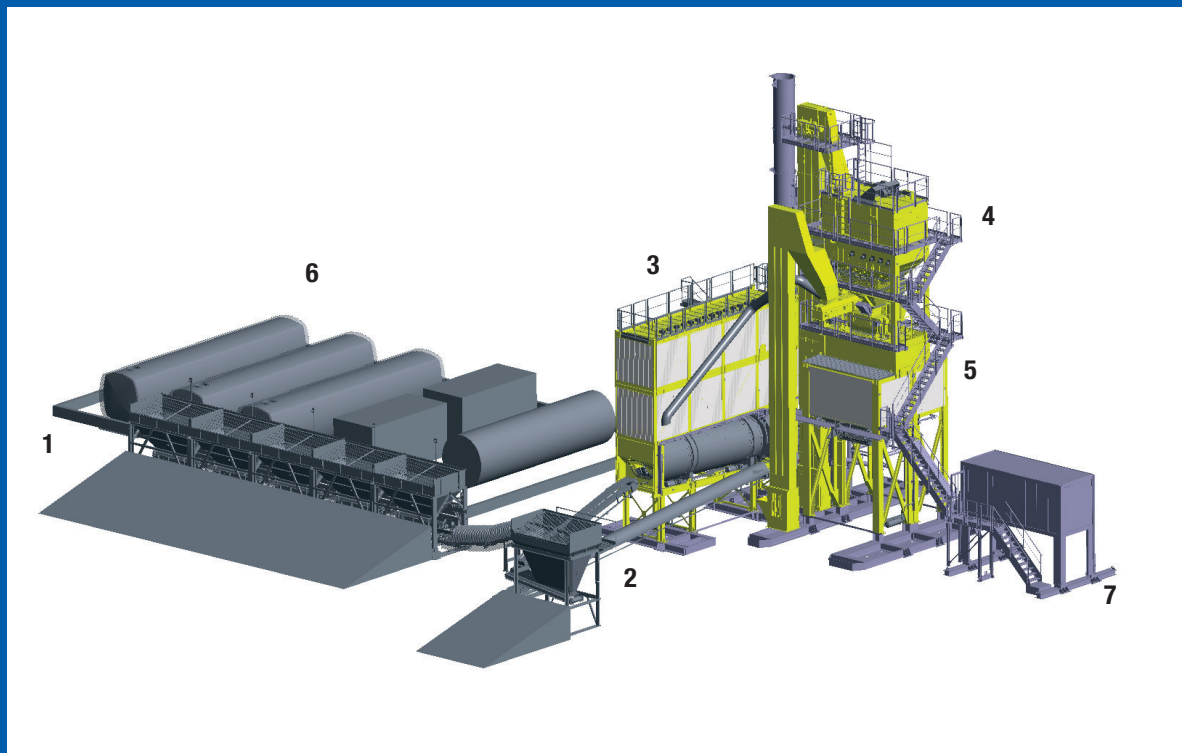
- dryer drum
- under filter storage silo
- filter

**4** mixing tower

- hot elevator
- screen
- hot aggregate bins
- metering of components
- mixer

**5** control cabin and automation

## BE TOWER 2000P



- 1** storage and metering of virgin aggregates
- 2** storage and metering of recycled materials
- 3** drying-filtering unit
  - dryer drum
  - under filter storage silo
  - filter

- 4** mixing tower
  - hot elevator
  - fines elevator
  - screen
  - hot aggregate bins
  - metering of components
  - mixer
- 5** hot-mix asphalt storage
- 6** binder storage tank
- 7** control cabin and automation



# BE TOWER : product range

MODEL	BE TOWER 1500	BE TOWER 2000P
Capacity at %3 moisture	120 ton/h	160 ton/h
Dryer	E180 (L=7,5m - D=1,8m)	E206 (L=8,5m - D=2,06m)
Capacity	7 MW	13,4 MW
Filter Bags Total Surface	413 m <sup>2</sup>	663 m <sup>2</sup>
Hopper Under Filter Capacity	15 ton	25 ton
Vibrating Screen qty	4-5 selection	5 selection
Total Screen Surface	14,6 m <sup>2</sup> - 16,3 m <sup>2</sup>	20,8 m <sup>2</sup>
Hot Aggregate Bin Capacity	17 ton	20 ton - 52 ton
Compartman qty	bypass + 4-5 selection	bypass + 5 selection
Mixer Capacity	1.500 kg	2.000 kg
Mixer motor power	2x 18,5 kW	2x 22 kW
Product silo capacity	Direct Discharge Std. 30ton-1 comp	Std. 30ton - 1 comp 2x30ton - 2 comp 2x70ton-2 comp 2x50+2x55ton-2 comp
Recycling Systems	up to 30% RAP into mixer	up to 40% RAP into mixer







# After sales service

*Complete customer satisfaction lies at the heart of our job and this requires a superior after sales service. MARINI can boast a high-quality service, backed up by an expert team of professionals who are at the constant service of the customer.*

## Retrofitting

Retrofitting gives new life to all site components and increases plant efficiency, even with regard to the strictest of new eco standards

- **up-grading:** gradual integration of new competitive technologies into existing plants
- **replacement:** substitution of obsolete solutions / dated or well-worn components
- **ecology:** implementation of RAP / WMA technologies and treatment of emissions
- **consultancy:** expert teams of specialists ready to collaborate with customers to identify the necessary modifications
- **not just MARINI:** ability to integrate MARINI technologies and components into asphalt plants of all brands

## Spare parts

A quality service for all plant types, based on 120 years of MARINI experience

- **highly qualified teams:** professional MARINI staff offer their vast expertise to identify and supply the necessary parts
- **out of stock parts:** ability to trace spares which are currently out of stock or find alternative solutions
- **stock management:** optimum stock control to ensure more than 80% availability of original spare parts
- **long-life guarantee:** original MARINI spare parts designed to guarantee superior durability when compared with cheaper alternatives
- **widespread market presence:** availability of a vast sales network which is in continual expansion
- **last minute shipments:** two daily shipments (plus last minute) with express service and special transport. Special saturday and sunday morning shipments upon request





## Training

MARINI is aware of the importance of well-prepared, competent staff who can ensure the efficiency and productivity of the plant and exploit its potential to the full. It offers the customer a comprehensive training programme, held either in the modern MARINI Training Academy or directly on site

- **foundation course for plant operators:** basic training for safe and better asphalt production with MARINI plants
- **burner management course:** basic concepts for burner management to reduce consumption and improve product margins
- **software course:** training programme for increasing awareness and competence when using MARINI software
- **maintenance course:** basic concepts for ordinary maintenance of MARINI plants with the aim of reducing down-time

## Technical assistance

The “MARINI Service” programme guarantees continual support for its plants worldwide. This is possible thanks to a team of constantly up-dated technicians and local MARINI partners. Consultancy, support and rapid intervention, even at long distance, are at the heart of “MARINI Service”, with the aim of establishing beneficial, long-lasting customer relationships based on:

- **quality:** rapid and reliable action in all services thanks to MARINI's competence and experience
- **erection:** supervision of all assembly stages to ensure total adherence to budget plans and time scales
- **testing:** customer support during final plant testing to guarantee optimum installation
- **maintenance:** regular inspections and programme planning for custom-made preventive maintenance
- **support H24/7:** long-distance customer assistance and support around the clock, with qualified staff ready to respond to all demands



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