

Graf Anlagenbau

Competence in Processing Technology



Fuel Supply for Asphalt Mixing Plants



Reduction of production costs plus protection of environment by using of renewable fuel.

Graf Technology makes the job !!

Through processing with Graf Technology mixed wood waste materials (even contaminated saw dust from furniture factories) can be upgraded to a level that it can be used as alternative fuel in standard solid material burners which are normally used for pulverized lignite.

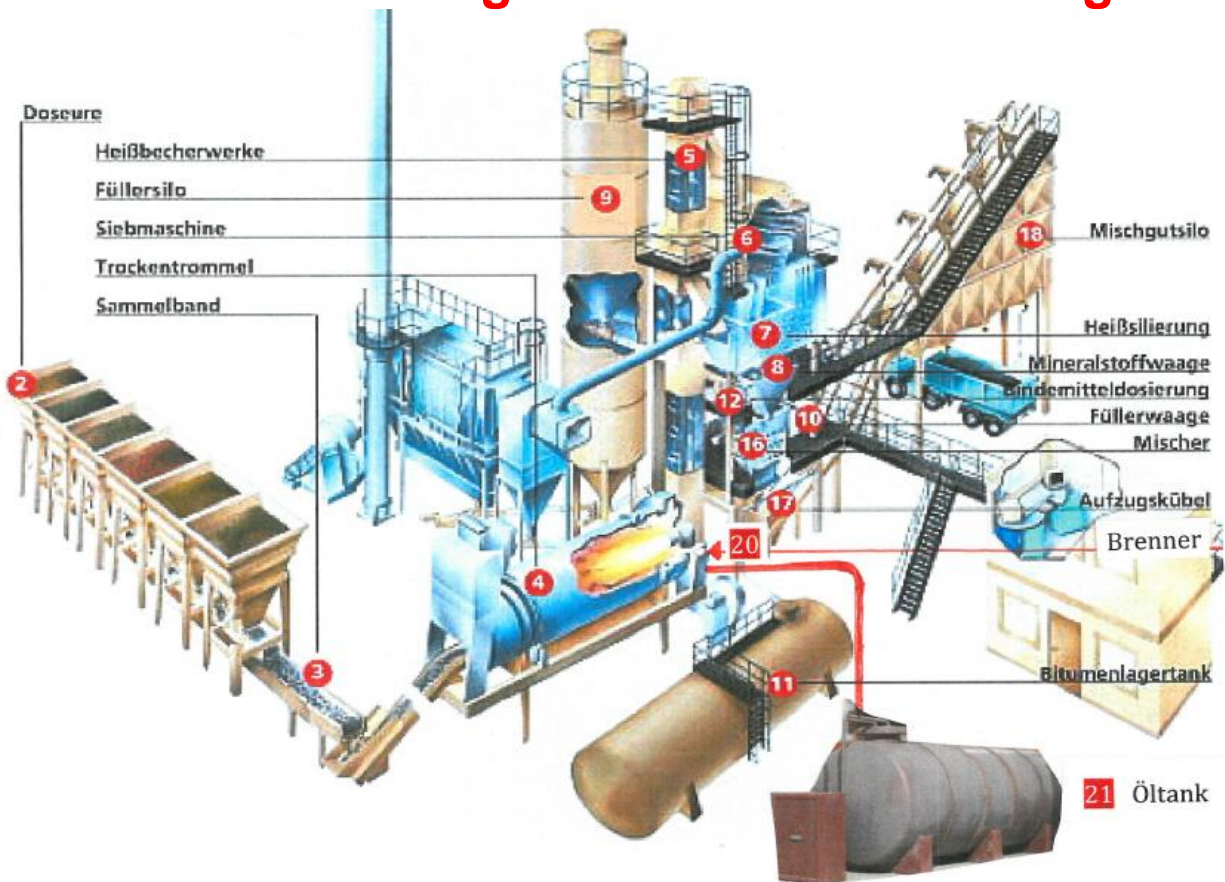
Graf supplies the turnkey-solution which includes:

- Raw material storage bunker
- Processing system for saw dust
- Final material silo, fuel silo
- Dosing and pneumatic conveying system to the burner
- Interface to burner control system

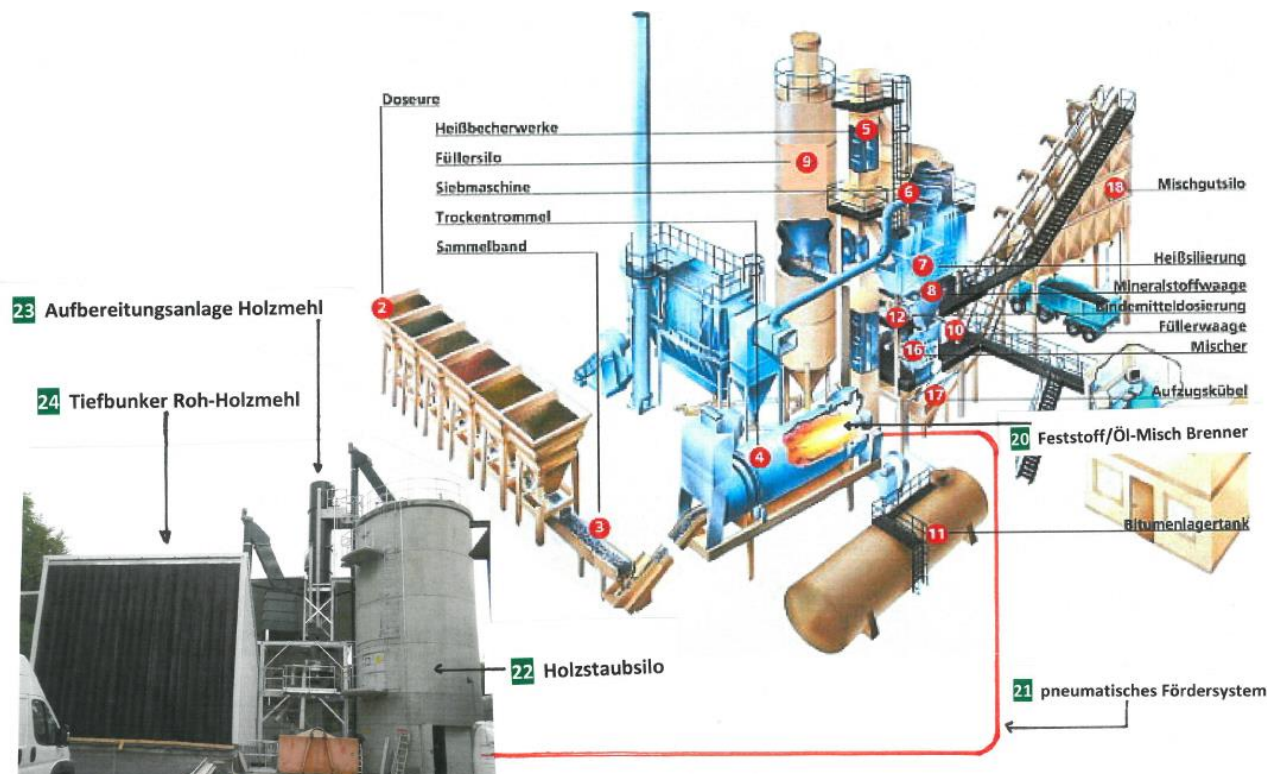
World wide first asphalt mixing plant fired with residues from furniture industry:



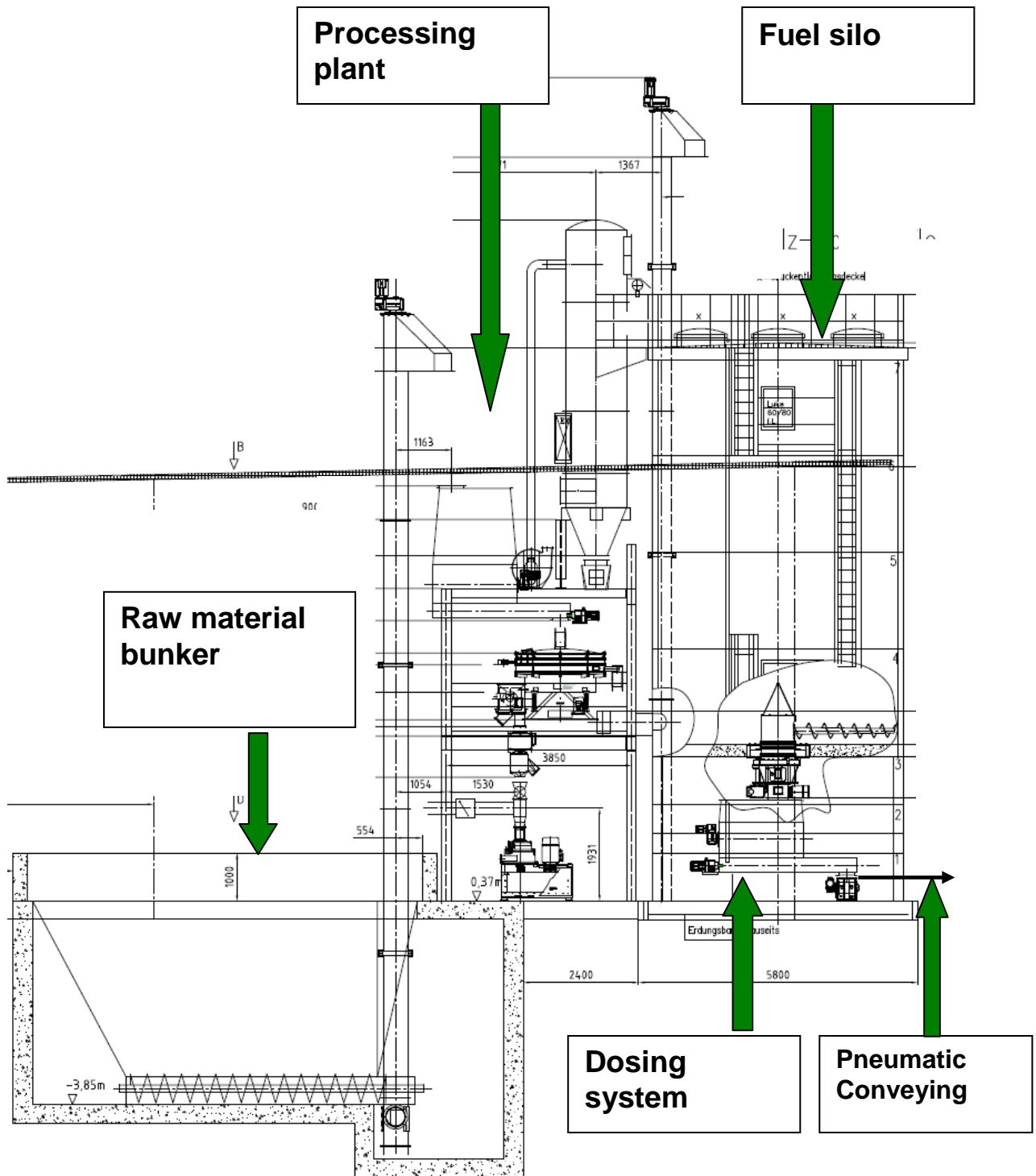
Conventional Mixing Plant with fuel oil firing



CO2-neutral mixing plant with wood waste firing



Plant Design



Technical Description

The raw material (normally sawdust from the production of furniture or chip boards) gets supplied by truck. The truck tilts the raw material into the raw material bunker. From the bunker the material gets dosed to the processing system by means of slowly rotating conveying units.

In the processing plant several processing steps are made with the material: Micronisation, metal separation and screening.

After this processing the material is in a quality and particle size that it can be used as fuel in solid material burners as they are used for example for pulverized lignite.

The processing is designed for handling various raw material qualities. Metallic impurities and big massive are sorted out.

The processed wood dust gets conveyed to the final material silo (fuel silo).

From the final material silo the material is fed via a high precision dosing system into the pneumatic conveying system to the burners.

The dosing system to the burners is independent from the processing line. This means that the processing plant also can produce material when the asphalt mixing plant is not in operation, in order to produce fuel on stock and to fill up the fuel silo

The complete plant is designed in single modules and can be delivered in different plant sizes. The basic plant HMA 400 has a capacity of approx 2000 kg/h (based on saw dust from a furniture factory). This is sufficient for the fuel supply for an asphalt mixing plant with nominal capacity of 160 t/h.

On demand bigger plants can be delivered with capacities up to 7500 kg/h saw dust.

The plant also can be designed for the processing of wood pellets.

Furthermore it is possible to add precrushing and/or drying modules to the plant for processing of lumpy waste (cuttings from chip board production etc) or fresh wood chips (for fresh wood chips also a drying stage will become necessary)

Due to the modular design the plant can be adapted to the available fuel source. Later amendments or modifications in case of change of fuel source are possible.

Wood Dust Processing Systems. Technical Data						
Plant Size		HMA 400	HMA 800	HMA 1200	HMA 800V	HMA 1200V
Drive power processing system	KW	70	130	240	130	240
Drive power pre-crushing	KW	not needed			85	120
Space demand raw material bunker	cm	500 x 800				
Space demand fuel silo	cm	550 x 550				
Space demand processing system	cm	250 x 450	300 x 600	300 x 800	1.200 x 800	
Capacity with saw dust	kg/h	2.000	4.500	7.500	4.500	7.500
Capacity with mixed wood pellets *)	kg/h	500	1.100	2.000	1.100	2.000
Capacity with dry wood chips *)	kg/h	precrushing needed			2.100	3.500
Capacity with chip board residues *)	kg/h				2.800	5.000

*) = experience values for prices data we have to make grinding tests with customers material

The plant modules in detail:

Raw material bunker

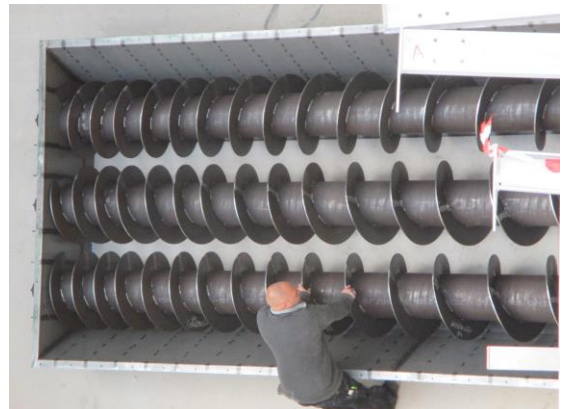
The raw material bunker can be filled by trucks with container tilting device (as shown on the picture) or via truck with walking floor discharge. With a volume of approx 120 m³ the raw material bunker has sufficient storage capacity.

For safe and reliable material discharge a heavy triple-screw discharge unit is installed. To avoid bridging effects of the material the bunker has a special asymmetric design. The whole unit has separate housing with rubber stripe curtain to assure that the dust emission during the unloading of the trucks is as low as possible.

Truck during unloading



Bunker with triple discharge screw during installation:



Processing unit

This is the core of the plant.

The raw material goes through the processing steps:

Micronisation

Screening

Metal separation

Separation of massive parts

With this processing technology also contaminated raw material or raw material in bad quality can be treated.



Fuel Silo

In this silo the wood dust fuel gets stored. The silo has a nominal volume of approx 120 m³. This is equivalent to the fuel demand for a 160-t/h-mixing plant for approx 2-3 working days. This volume plus the 120 m³ of the raw material bunker gives the whole system a fuel storage capacity of approx one production week of the mixing plant.



For reliable material discharge out of the fuel silo we install a discharge screw system which covers the complete bottom surface of the silo. Due to this any material blocking or bridging effect is avoided.

Dosing System and Pneumatic Conveying to the Burners

A deciding factor for the save and reliable operation of the burners at lowest possible emission rates is the precise and constant feeding of the fuel to the burner. This is assured by our technology with specially developed high-precision dosing screws in combination with special rotary valve feeder. A further important detail is the flow-optimized design of the tubing system and the control unit for the compressed air supply.



*2 separate Dosing lines:
To burner "white" line
To burner "black" line*

*Control unit
Air for conveying*



Process Control System

Not only in motorsports the saying: **Power is nothing without control** is valid. Our electronic process control system supervises and regulates all relevant operation parameters of the plant.

More than 20 level indicators assure that in all process steps the correct amount of material is treated and that the plant works in optimal conditions.

All relevant drives have an independent rotation control sensor.

In case of troubles or if feeding silo is empty the plant is shut down in a controlled sequence.

Precisely defined and redundant interfaces to the burner control unit assure a save operation of the asphalt mixing drum, and low the operator to run the mixing precisely in optimal conditions. Thanks to the intranet-connection the mixing plant manager can check and control all parameters from his desk

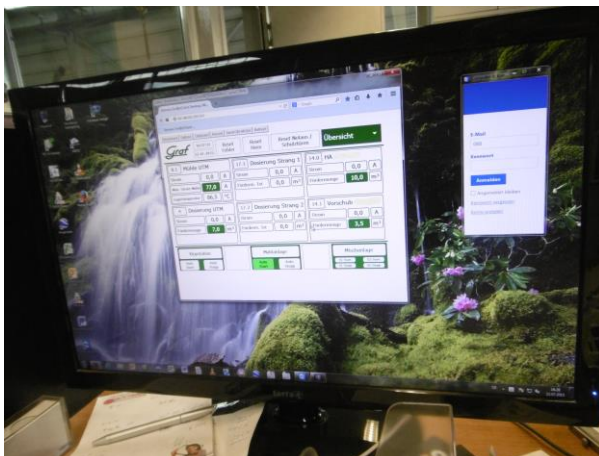
Hardware:
Switch board installed in separate room



All parameters on a view:
Control panel



Remote access from desk of
Plant manager



Rotation control for drives



Protection against Dust Explosion and Fire

Wood dust belongs to the dust explosion dangerous materials.

We design our plants accordingly by avoiding appearance of ignition sources and heat pockets wherever it is technically possible.

All conveying systems run with a peripheral speed below 1 m/sec. All hoppers are equipped with level indicators to assure that they never can run empty.

Metallic impurities which can create ignition sources are separated.

The micronizing system is designed pressure shock resistant with blow-out discs in the filter and the feeding chute.

Flame traps and flame proof rotary valves are decoupling the micronizing system from the rest of the plant.

The raw material bunker as well as the dedusting filter and the fuel silo have extinguishing water connections.

***Rotary valve
Flame proof***



***Air inlet tube with
flame trap***



Feeding chute with blow-out disc



Blow-out discs at filter

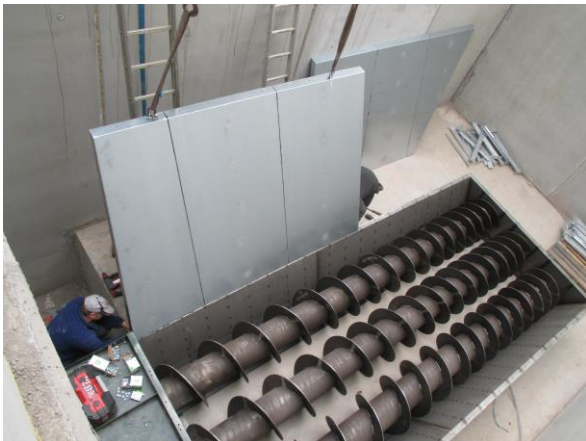


Quick Assembly

Due to the modular plant design with pre-assembled construction groups the plant can be erected mechanically within one week.

This assures the smallest possible level of disturbances of the regular production in the mixing plant, naturally the mixing plant can continue in operation during the erection of the wood dust plant. Only on the final day, when we have to connect the wood dust feeding system to burner the asphalt production must be interrupted for approx one day.

***Installation of triple screw system
And segments of raw material bunker***



Erection of fuel silo



***Preassembly of one module
Of processing system***



***complete module gets
lifted and connected to the plant***



All modules also can be installed in 20-ft-container chassis. This assures cheap transport costs to overseas construction sites, quick assembly at site and allows quick dismantling and relocation of the plant.

Graf Anlagenbau



Competence in Processing Technology

For more than 25 years we are your competent supplier for machines, systems and tailor-made solutions for processing for dry materials

Our systems cover the processing steps:

- Material feeding and storing
- High precision dosing units for feeding to the processing unit
- Fine grinding, micronisation, granulation
- Sieving and sorting
- Air classification
- Mixing and homogenisation
- Conveying (pneumatically and mechanically)
- Final product storage and filling
- Electronic process control

We supply worldwide single components but also complete processing systems turnkey including installation and commissioning at site

Customized solutions, if needed even with integration of second hand machines are our standard.

Plant design tailor-made by GRAF Anlagenbau means:

Our plant design is adapted to your specific demands !!
(and not vice-versa...)

We look forward to receive your request

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