PARGET
MAKİNA
Built for the Best

LIME TECHNOLOGY
SOLUTIONS BY PARGET

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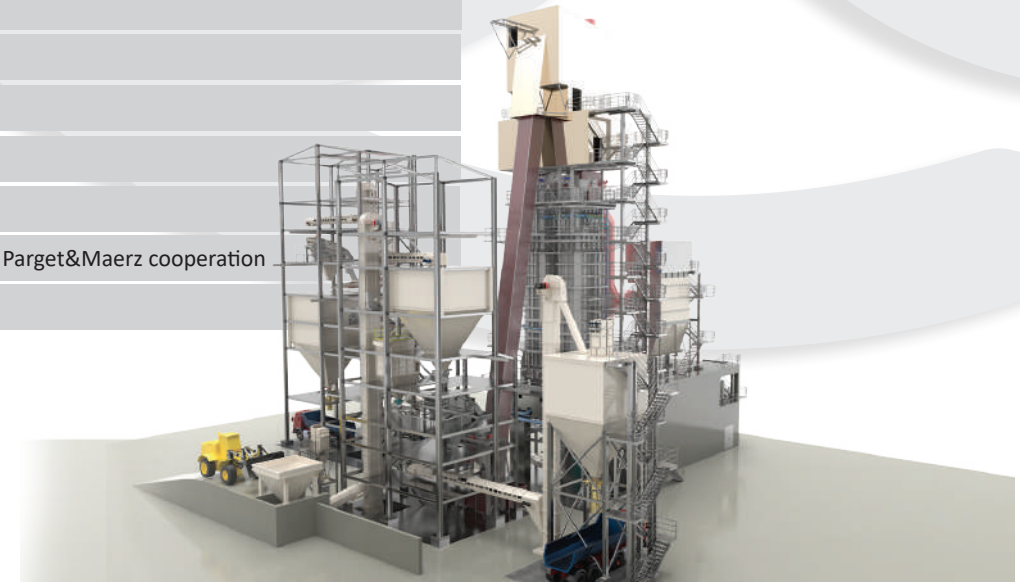
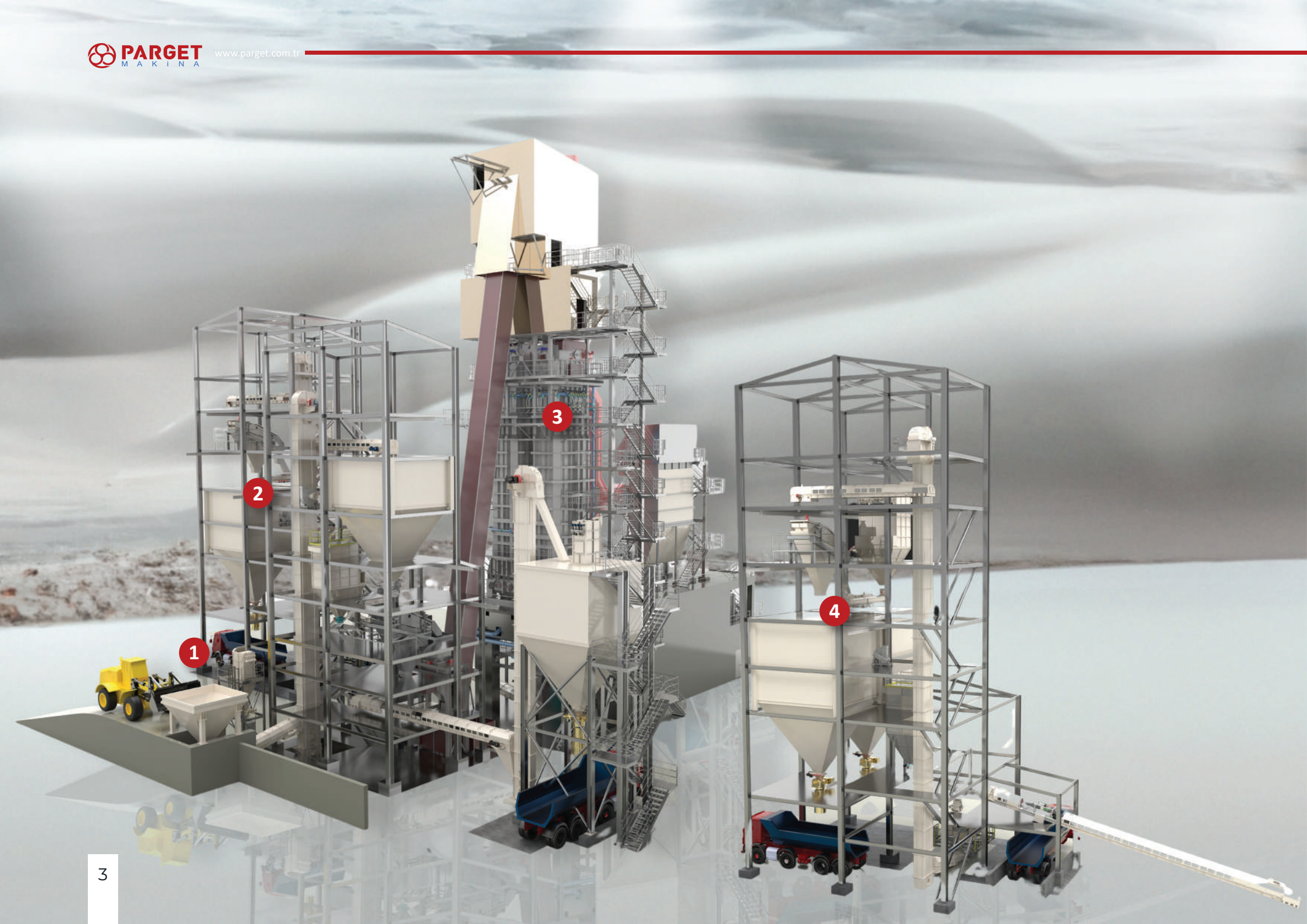
Parget Lime Technology Features

- In cooperation with the biggest lime kiln and hydrator technology supplier Maerz Ofenbau, ***Parget Makina*** designs and supplies complete turn-key plants for calcined, grinded and hydrated lime production, to ensure that the products meet market requirements and comply with customer specifications.
- The main advantage of purchasing lime technology from Parget with Maerz Ofenbau cooperation is to receive coordination, project managment and intergration of different units of Lime plant by one single company Parget Makina which will simplify and reduce project risk of the Customer.

Features	Benefits
Daily Capacity	Flexibility : from 150 to 1000 tons per day
Calcination process	With Vertical kiln designed by Maerz
Final product	Calcined lime
	Grinded lime
	Hydrated lime
Energy Consumption	Possibility to use different fuels as natural gas, heavy fuel oil, diesel, coal etc
	Very economical and environmental friendly
Plant Design	Flexible layout according to customer needs
Complete automation	Controllable, secure and easy in use process
	Low operation cost due to low number of staff involved.
Technical process	High effectiveness and efficiency
	Easy and practical project coordination and management due to Parget&Maerz cooperation
	No production waste

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Parget Lime Production Line Process

The process described below will be applied for the Raw material feeding, storage and screening, calcination , crushing and storage unit, hydration of lime.

Raw material feeding, 1 storage and screening unit is used to feed, store and control screening of raw material and feed it to the vertical kiln. Raw material with a fraction 40-80 mm is fed from feeding equipment to storage silos with belt conveyors. Instead of using long tranfer belt conveyor, it is also possible to use bucket elevator conveyor. Dedusting of the unit will be done by the dedusting filter and fans .

The raw material storage and the screening 2 unit mainly consist of the storage silo where the raw material is stored, the vibratory screen to screen and prepare the raw material according to the tolerances. Even if the material is brought with requested fractions, it may be crushed during transfer and storage. Therefore, it must be screened again, brought into requested tolerances, and then fed to the calcination unit.

The calcination unit 3 consists of the kiln, weighing and charging equipments, the vertical lime calcination kiln and the dedusting system. The prepared material will be weighed and fed to the skip bridge bucket and later with skipper winch it will be transfered to the calcination kiln. Depending on the final product, the raw material will be calcined under a certain temperature, pressure and time inside the kiln and later discharged by the help of the kiln discharging equipment to the discharge to belt conveyor. Meanwhile the necessary dedusting will be provided by the kiln dedusting system filter. The inside of vertical kiln is lined with different refractory materials. All air flow of the kiln is done and automaticly controled by traps, blowers and hydraulic system.

The calcined lime will be discharged to the belt conveyor to be transferred to the **lime handling, storage, crushing and filling unit**. 4 This unit is used to produce the calcined lime according to the final usage of the product. Particle size and their range will be specified by the Customer. The lime will be fed from the kiln to the crusher to be crushed and later to the vibratory screen in order to screen and classify to the requested particle sizes. Based on final product particle size, different types of crushers can be used as jaw crusher, hammer crusher and roller crusher. Eventually the lime with required fraction will be stored in the storage silos. Depending on Customer request, final product can be filled from storage silos to the open trucks, bulk carrier, big-bags etc.

Types of materials that would result ouf of the process:

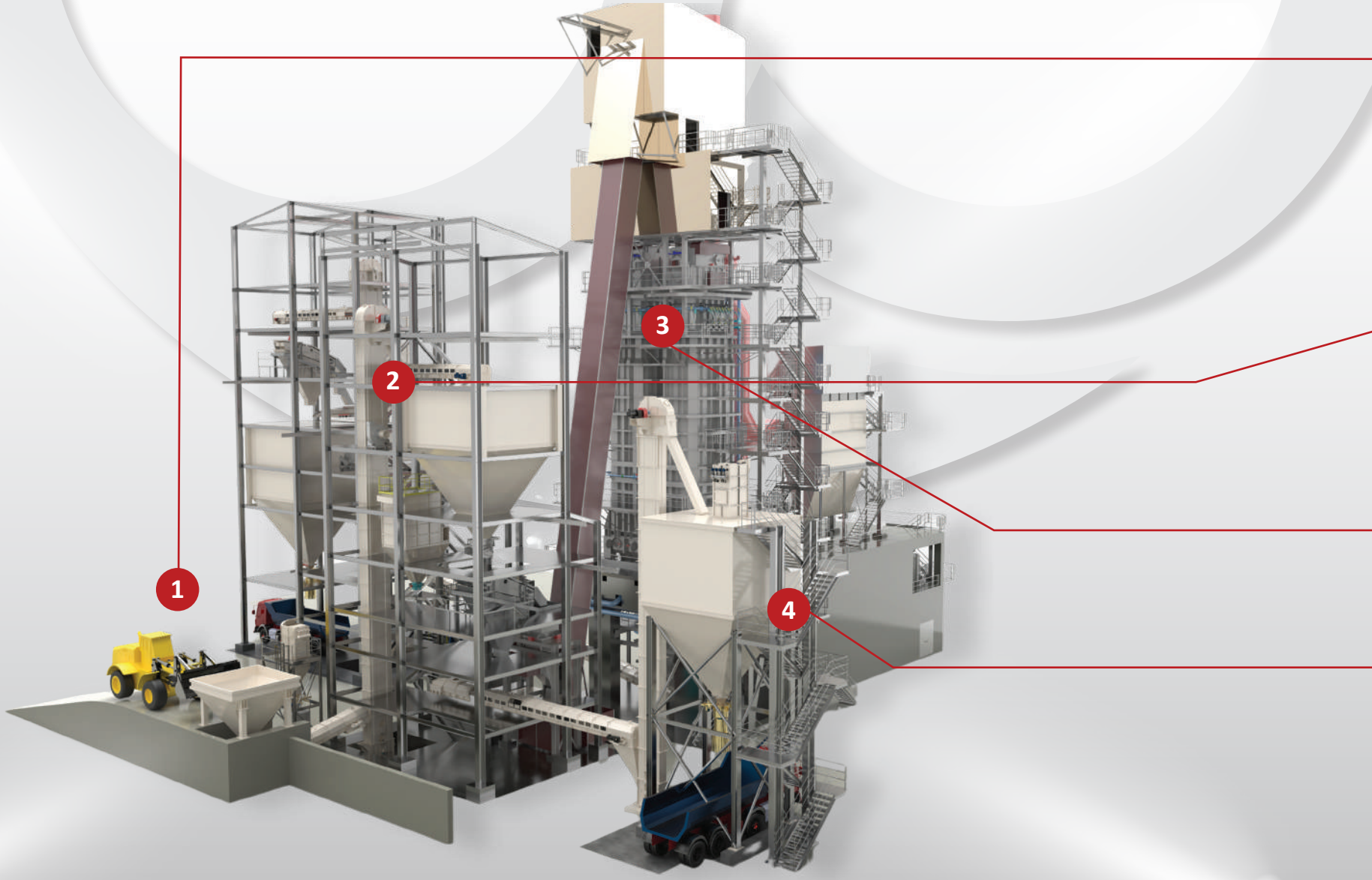
1 Calcined lime is the material that we get after the calcination and the crushing to different fractions from 0-3 mm to 0-80 mm, any other fractions between is possible.

2 Grinded lime is a second type of product produced in lime plant. In order to produce this product other grinding and classifing equipment are used. Also based on the request of the Customer, storage silos and different type of filling and packing equipment are used in order to deliver grinded lime to the final users.

3 The hydrated lime is another final product which can be produced on the plant supplied by Parget&Maerz.

The hydrated lime is obtained as a result of the reaction during the mixing of calcined lime with water in „hydrator". Feeding of the lime to the hydrator is done by dosing and weighing belt conveyor. After lime is hydrated it is fed for primary seperation and for the grinding. Seperation is done by dinamic air separator and grinding is done by ball mill. After the grinding hydrated lime is fed back to the seperator for reseparation finally to meet required fraction. Evntualy, hydrated lime is stored in the storage silos and filled or packed to bulk carrier, big bags, PP bags ets.

Lime Production Plant's Units



1 Raw material feeding unit

- Ease of maintenance.
- Smaller installed power, less electrical consumption.
- Possibility of using bucket elevator and belt conveyor for raw material feeding.
- Different desing based of quality of raw material

2 Raw material storage and screening unit

- Smartly designed unit and machineries according to the raw material quality tolerances.
- Smartly design of the unit in order to arrange uninterrupted operation of the vertical kiln

3 Calcination unit

- Using technology of years of experience and know-how by the best lime calcination technology supplier „Maerz”
- Smooth operation
- Guaranteed product quality, less production losses.
- A lot of different types of fuel that can be used.
- Different types of kilns basing on raw material and final product quality
- Completely automatic operation system
- Capacity ranges from 120 t/day till 800 t/day with one single kiln

4 Lime handling, storage, crushing and filling unit

- Flexible design according to the requested material type and range.
- Different type of filling and packing possibilities
- Compact design

Hydration Unit

- Maerz branded hydrator with best quality.
- Smart design of grinding and classifying systems.
- Guaranteed product quality.
- Possibility to produce different fractions with one single unit
- High level of automation for automatic operation and control

Calcination System

The PFR kiln type from Maerz has the highest efficiency and the lowest energy consumption of all lime kilns. The PFR kiln enjoys the label of the greenest production of lime. True to the motto ”PFR for Green Steel”.

Features

- Highest thermal efficiency.
- Lowest fuel consumption
- By far the most and the largest kilns builtworld-wide.
- Always the latest technology.
- The best service world-wide.
- Smooth operation
- Guaranteed product quality, less production losses.
- A lot of different types of fuel that can be used.
- Different types of kilns basing on raw material and final product quality
- Completely automatic operation system
- Capacity ranges from 120 t/day till 800 t/day with one single kiln

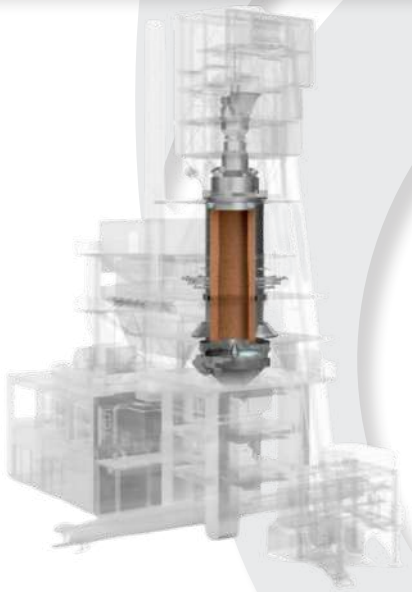
Kiln's types

Circular Maerz PFR Kiln

- Parallel Flow Regenerative lime kiln with circular cross section
- Ring channel with supsended cylinder
- Capacity 200 – 800 tpd burnt lime
- Grain size of charged limestone 15 – 120 mm
- Product quality: high reactive (for steel plants)
- Key criteria: kiln with highest thermal efficiency

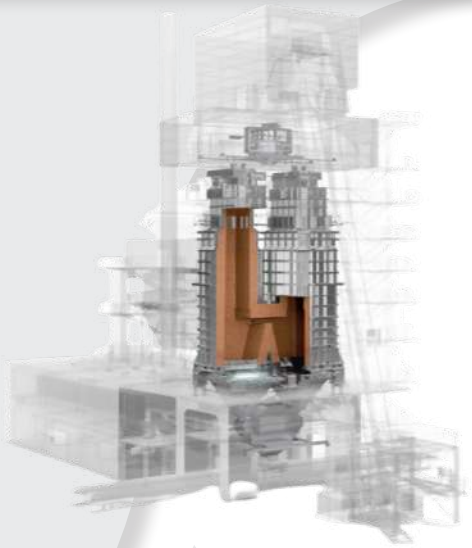
Kiln's types

Maerz HPS Kiln



- Single shaft kiln with lateral burners
- Capacity 50 – 200 tpd burnt lime
- Grain size of charged limestone 15 – 80 mm
- Product quality: low reactive ("hard burnt" e.g. for the production of aerated concrete)
- Key criteria: kiln for hard burnt lime

Rectangular Maerz PFR Kiln

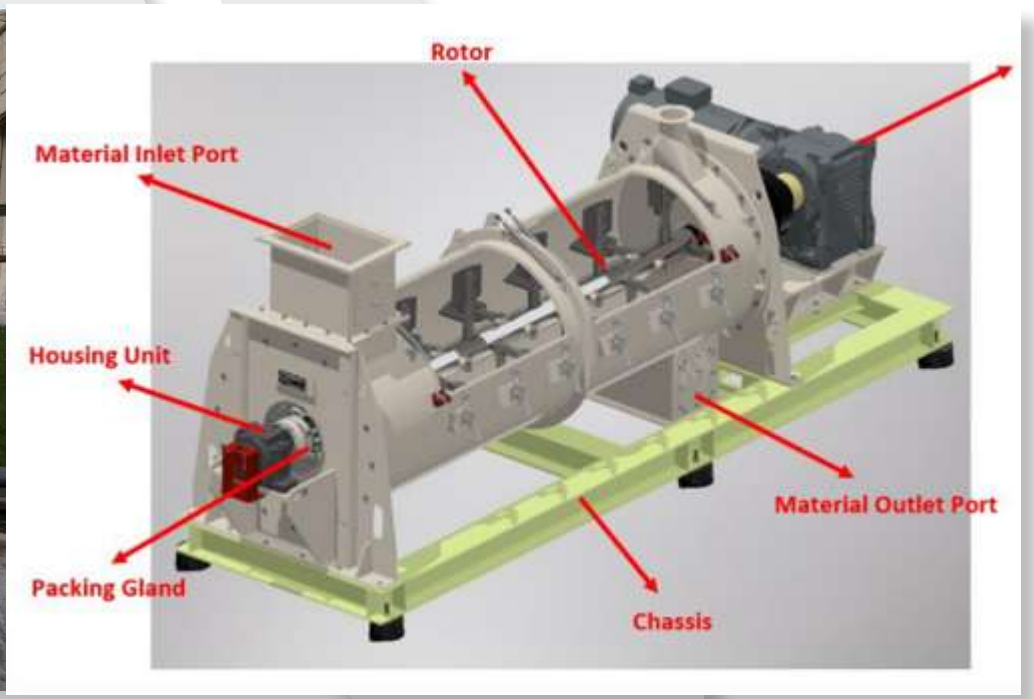


- Parallel Flow Regenerative lime kiln with rectangular cross-section
- Direct crossover channel
- Capacity 100 – 300 tpd burnt lime
- Grain size of charged limestone 30 – 120 mm
- Product quality: high reactive (for steel plants)

Weighing and Mixing System

Continuous Mixer

Continuous Mixer was specially developed for homogeneous mixing of mineral and chemical additives. The machine is working according to the principle of a centrifuge. It is designed with different dimensions and capacity depending on the intended use, feeding material properties and capacity. Continuous Mixer enable accurate mixing of all types of products from fine powdered materials to coarse ground ingredients. The rotor and its mixing blades are mounted to mix the materials radially. That structure enables homogeneous mixing.



Weighing and Mixing System

Continuous Mixer

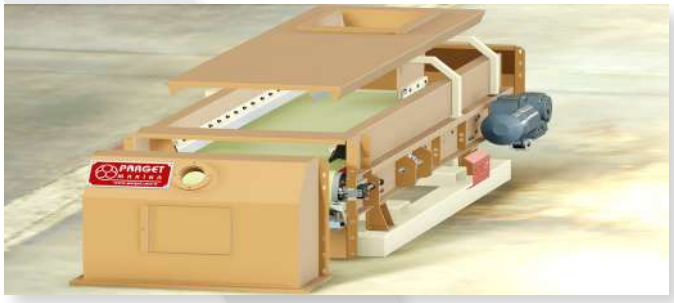
Weighing and Mixing System

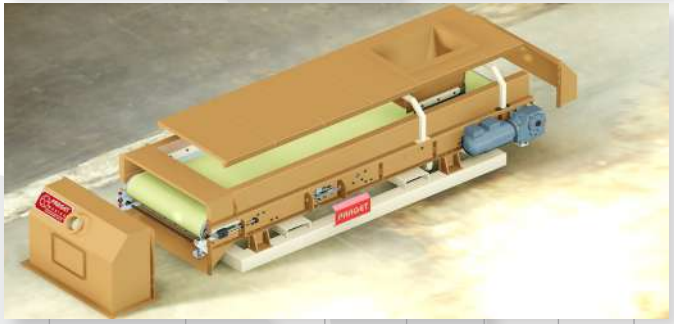
Weighing Dosing Belt Conveyors

Description: Weighing belt conveyor is used for feeding powder and granular materials as continuously weighing within a fixed time period. It is designed depending on the material type to feed, handling capacity and dosing volume.
The material is passing through on the belt is weighed in short periods and constantly, thanks to the weight-sensitive platform and high-precision measurable load-cell.

Parget Makina designed weighing belt conveyor is an economical and effective solution for dry dosing systems. It can be used especially for dosing of free-flowing materials with irregular flow and non-free flowing materials (very dry and fine or wet materials)

WEIGHING BELT CONVEYOR	FEATURES	BENEFITS
	CAPACITY	• WIDE RANGE OF CAPACITY 1 - 80 T/H
	WEIGHING MECHANISM	• AUTOMATIC TARE AND CALIBRATION SETTINGS • +-%2 WEIGHT ACCURACY • COMLIANCE WITH OIML (ORGANISATION INTERNATIONALE DE METROLOGIE) STANDARDS • OPTIONAL AUTOMATIC AND MANUAL OPERATION • HIGH WEIGHT ACCURACY OF LOADCELLS • ACCURATE AND STABLE WEIGHING IN REQUIRED CAPACITY AND TOLERANCE • HIGH DOSING EFFECTIVITY
	CONVEYOR BELT	• WEAR RESISTANT • NATURAL OR SYNTHETIC RUBBER MATERIALS • RESISTANT TO WEATHER CONDITIONS,SUITABLE FOR CONVEYING ABRASIVE AND COARSE MATERIALS • HIGH IMPACT RESISTANT • SIDE SCRAPPER SYSTEM, PREVENTING FALLING OUT OF MATERIAL FROM BELT EDGES • BELT DIRECTING SYSTEM, CONTROLLING BELT MOTION AND PREVENTING BELT SLIPPAGE • LIMIT SWITCH, WARNING IF BELT SLIPPAGE OCCURS
	DRIVE UNIT	• OPERATION OF MIXING, FEEDING AND CONVEYING UNITS WITH SINGLE DRIVE
	AUTOMATION SYSTEM	• USER - FRIENDLY • INTEGRABILITY WITH EXISTING SYSTEM • EASY PRODUCTION DATA REPORTING SYSTEM





Tip	Capacity range	Motor power	A	B	C	H	H1	L
			mm	mm	mm	mm	mm	
PM-WBC500	1-10 t/h	2,2-3 kW	820	*	*	114	min.650	*
PM-WBC650	2-15 t/h	2,2-5,5 kW	1000	*	*	114	min.710	*
PM-WBC800	10-30 t/h	3-5,5 kW	1150	*	*	114	min.850	*
PM-WBC1000	20-50 t/h	3-7,5 kW	1300	*	*	114	min.940	*

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Grinding and Classifying System

Centrifugal Type Beater Plate Mills

Description: Centrifugal type beater plate mill is used for grinding materials with low and medium hardness, such as gypsum, calcite, limestone etc. From an inlet size of 0-12 mm to an outlet size of 0-1 mm

AIM

The aim of the specification is to define general design parameters and specification of the centrifugal type beater plate mill manufactured by Parget Makina.

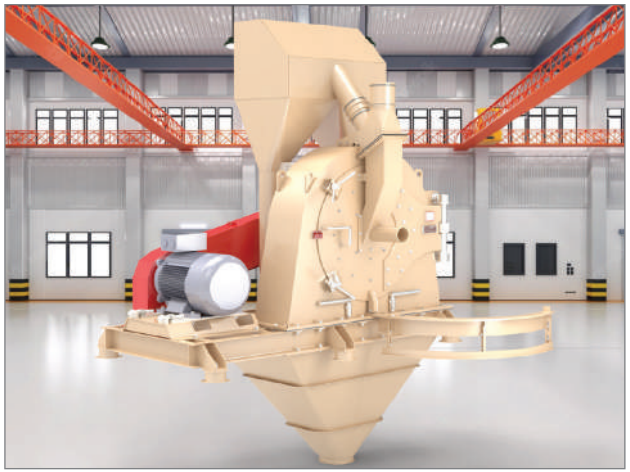
GENERAL DESCRIPTION

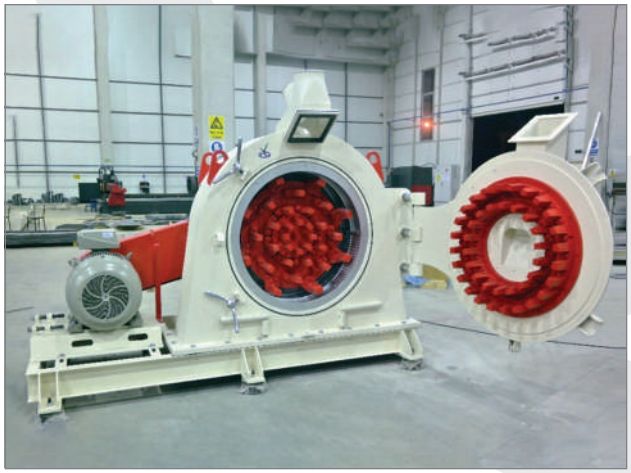
Centrifugal type beater plate mill is used for micronize materials with low and medium hardness, such as gypsum, calcite etc.
Centrifugal type beater plate mill produce a finish product size according to the material structure, cells in perforated screens or grate bars, size and type of hammers, grinding plate settings, rotor speed.
The grinding material is fed into centre of rotor through the inlet that placed on the cover.
The material is grinding by the impact of the hammers that placed on the rotor by throwing up to the stator of the mill. The required material is passing and discharging through the lower sieve, which is adjusted according to the desired material size. The grinding process of the material is implemented between concentric placed rotor with hammers and fixed stator hammers.
The upper hood controls pressure that appears during the rotor rotation. The rubber sealing that placed on the main body prevents dust ingress to the outside

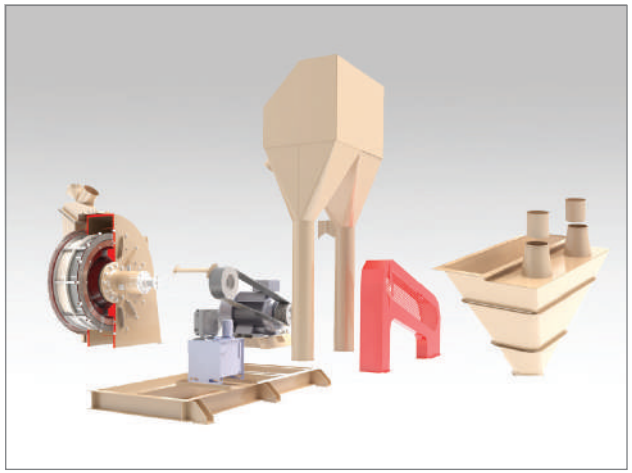
SCREEN SET

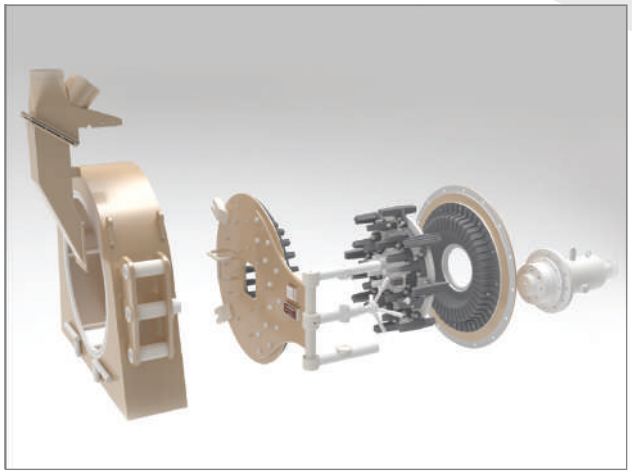
The screen is mounted between 2 and 3 flanges and fixed with studs.
The screen is covered by wear plate. The diameter of the wear plate depends upon the grinding material size. Thus, after receive the required size the material is discharging to the bin placed under the mill. The material that haven't reached the required size stays in the mill and continue grinding. The wear plate can be made from different type of sheet metal with different cells dimensions.
The wear plate can be used in the case of grinding hard materials.
The material of sieve and diameters of cells are designed according to the chemical properties and fineness of the grinding material.

Machine Type	Machinery Capacity (t/h)
PM_D630	10 - 15
PM_D770	15 - 25
PM_D900	25 - 35
PM_D1100	40 - 45









Grinding and Classifying System

Dynamic Air Separator

Description: Dynamic Air Classifier is used for seperation of materials which has medium hardnesses such as gypsum, calcite, lime etc. It is possible to get particle size on the outlet from 0-90 micron till 0-630 micron

AIM

The aim of this specification is to describe the general design parameters and specification of Dynamic Air Classifier manufactured by Parget Makina.

SCOPE

Specification scope is limited by description of design details of Dynamic Air Classifier manufactured by PARGET MAKİNA İMALAT İNŞAAT MÜHENDİSLİK SAN. VE TİC. LTD. ŞTİ

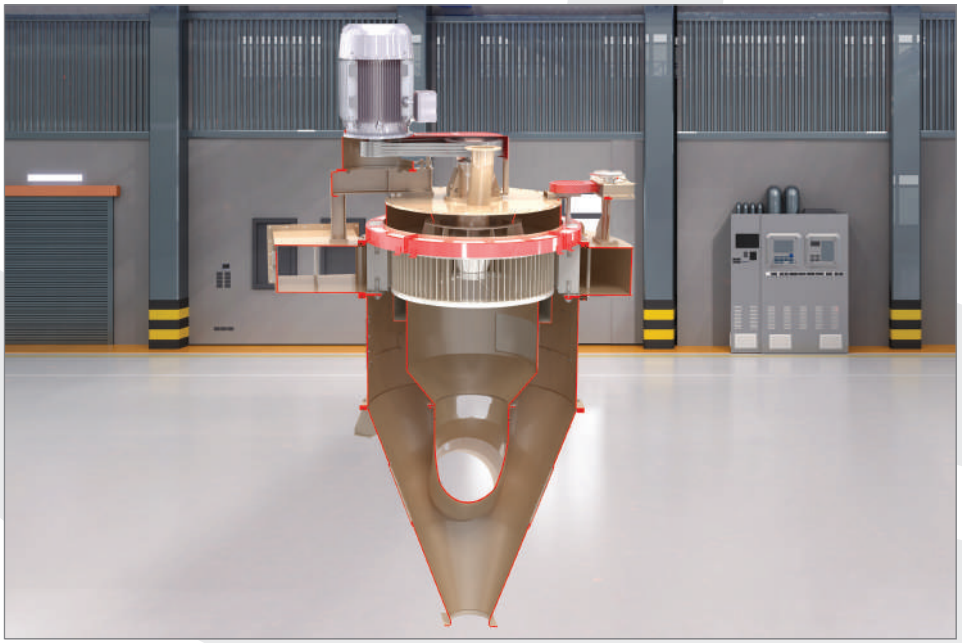
GENERAL DESCRIPTION

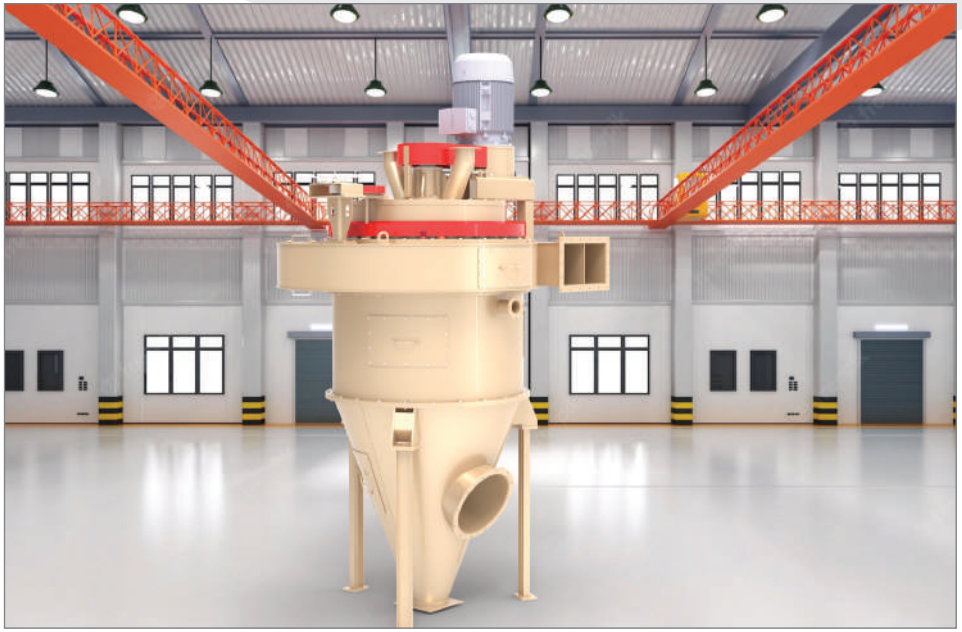
Dynamic Air Classifier is used for separation of micronized gypsum, calcite and cement and other micronized powder materials with medium hardness. Generally, it is used for the separation of required particle size of calcined product. After separation of required particle size, the rest of material can be sent back to the grinding process or to the storage unit to be used in different products.

Dynamic Air Classifier can be designed in different sizes and capacities depending on the required particle size of final product, capacity, particle size, structure and other characteristics of material to be separated.

With the help of the classifier, it is possible to obtain two different products with minimum and maximum particle size distribution. Product, bigger than required, comes out of bottom outlet cone. It can be returned to the process for re-grinding, thus, to conform to the required size. With the help of the cyclone, it is possible to obtain product with small and fine particle size.

Machine Type	Capacity (t/h)
PM_DAC630	4 - 5
PM_DAC800	8 - 10
PM_DAC1000	12 - 14
PM_DAC1250	16 - 20
PM_DAC1500	26 - 31
PM_DAC1750	32 - 38





Vertical and Horizontal Conveying System:

Bucket Elevator

Chain Type

Belt Type

Description: Bucket elevator is the mechanism for conveying bulk, powder and granular materials such as gypsum, calcite, lime, cement etc, vertically

AIM

The aim of this specification is to describe general design parameters and specification of bucket elevator manufactured by Parget Makina

SCOPE

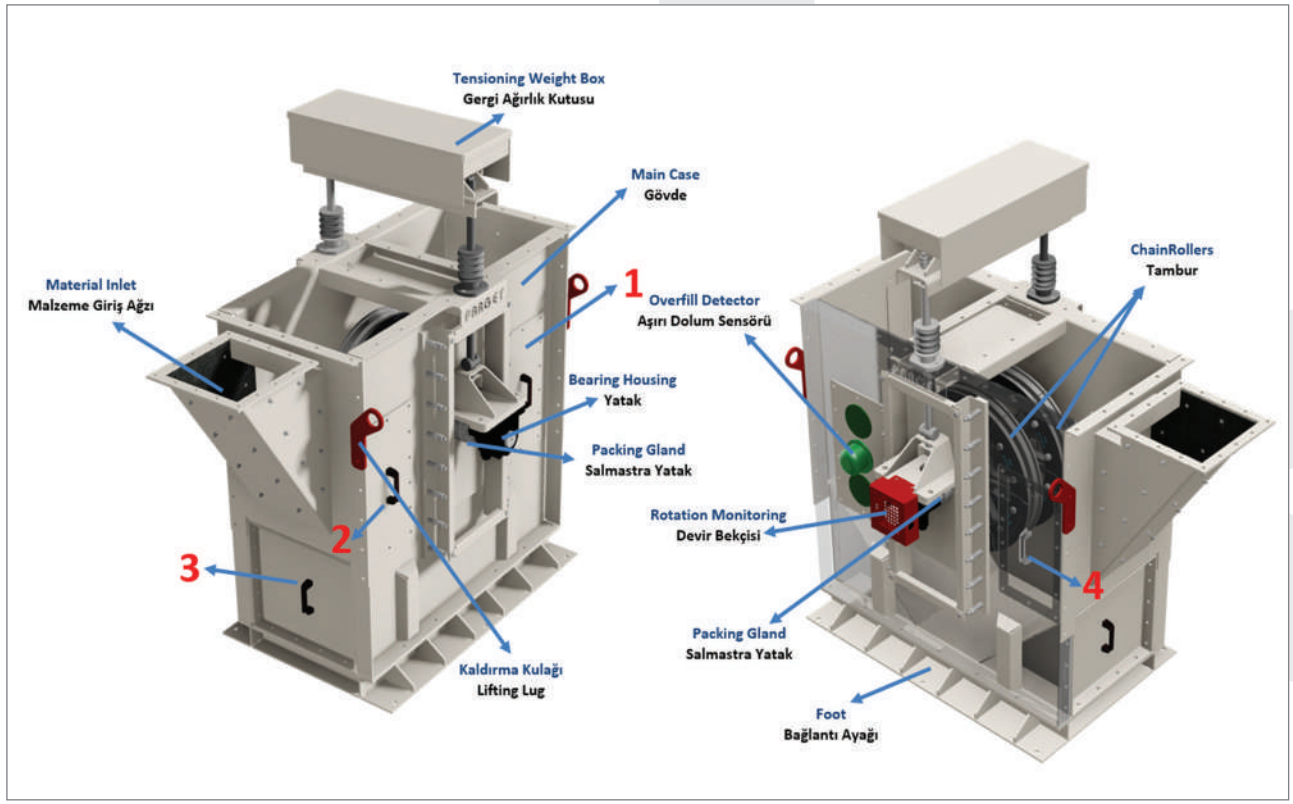
Specification scope is limited to description of design details of bucket elevator manufactured by PARGET MAKİNA İMALAT İNŞAAT MÜHENDİSLİK SAN. VE TİC. LTD. ŞTİ

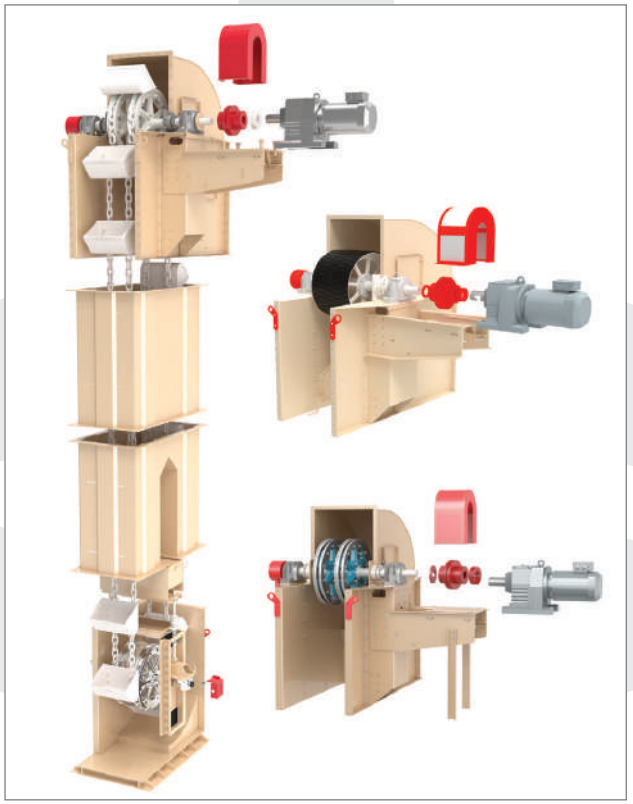
GENERAL DESCRIPTION

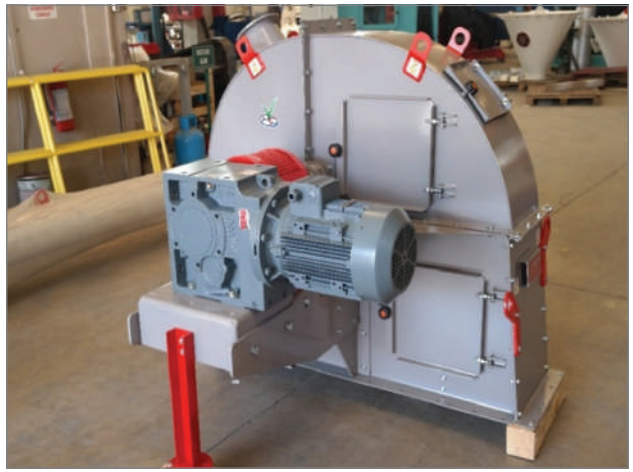
Bucket elevator is a mechanism for hauling flowable bulk materials, often powder and granular, vertically.
A chain, placed between the chain rollers, carries the buckets elevating material from the feeding point until the top.
Bucket elevators are designed depending on material type and density, conveying distance, capacity and other criteria.
There are two main designs:
Belt elevator,
Chain Bucket Elevator
Central Chain Type,
Double Chain type,

Bucket elevator consists of tension unit, drive unit and intermediate vents.
Tension and drive units include chain rollers, shaft and bearing houses.
Buckets are mounted to the tense chain which is placed between rollers of tension unit and drive unit.

FEATURES			
Machine Type	Motor Power (Kw)	Capacity (t/h)	Dimension (length)
PM-ECC200	Depends on the Capacity, length of the machine and product features	Different capacity from 5 t/houruntil 200 t/hour, depending on the product features.	Different leghths depending on the customer request and the Project requirement.
PM-ECC250			
PM-ECC315			
PM-ECC400			
PM-ECC500			
PM-ECC630			


Tensioning Weight Box
Gergi Ağırlık Kutusu
Main Case
Gövde
Material Inlet
Malzeme Giriş Ağzı
1
Overfill Detector
Aşırı Dolum Sensörü
Bearing Housing
Yatak
Packing Gland
Salmastra Yatak
2
3
Kaldırma Kulağı
Lifting Lug
ChainRollers
Tambur
Rotation Monitoring
Devir Bekçisi
4
Packing Gland
Salmastra Yatak
Foot
Bağlantı Ayağı





Vertical and Horizontal Conveying System:

Belt Conveyors

Description: The belt conveyor is used for conveying different kind of materials in horizontal or inclined way on a certain angle positions.

AIM

The aim of the specification is to define general design parameters and specification of the belt conveyor manufactured by Parget Makina.

GENERAL DESCRIPTION

The belt conveyor is used for conveying different kind of materials in horizontal or inclined way on a certain angle positions.
Belt conveyor can be produced in different kind of models depending on the used area, material properties, capacities, conveying distance.
Belt conveyors with the high reliability and low energy consumption are preferred to be used in every area where different materials are being conveyed.
Modified conveyors can be operated with abrasive, corrosive, hot, chemicals, fragile and brittle materials.
Types of the belt conveyor;

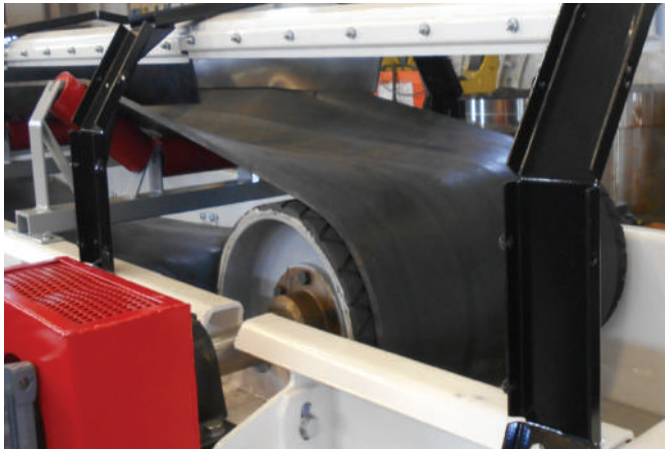
- **Flat type**
- **Trough type**
- **V type**

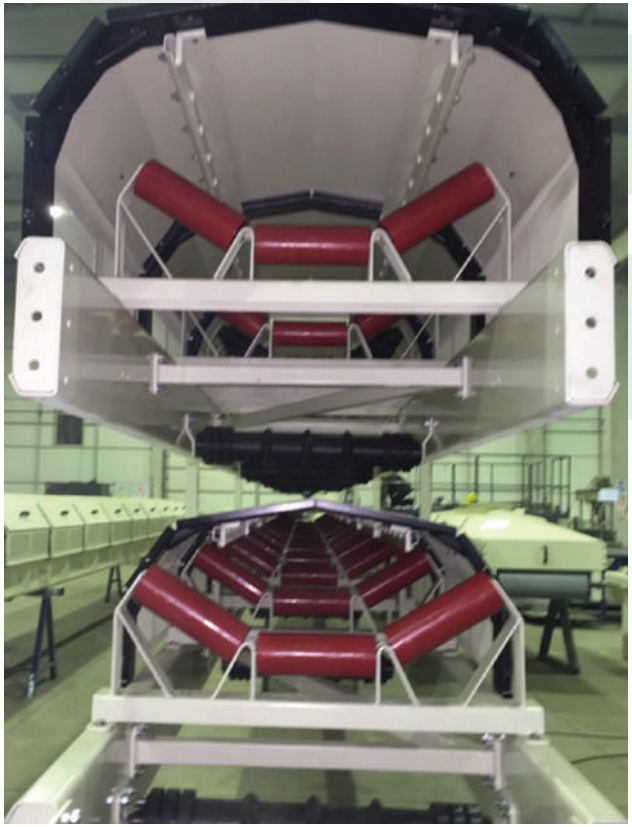
The basic elements of the belt conveyor are: support frame, drive and tensioning stations, carrying idlers, conveyor belt, inlet and outlet, ladder and platform. The elements of the tensioning station are: tensioning drum and bearings. The elements of the drive unite are: drive drum, bearings, geared motor.
In addition, there are maintenance hatches that enable an easy intervention in cases of breakdown.

CONVEYOR BELT SPECIFICATIONS

Conveyor belt is chosen according to the conveyed material specifications can be PVC, polyurethane, rubber etc. The appropriate width of the belt conveyor prevents material spillage and the inlet width allows the largest parts of the material to pass smoothly. Belt thickness range is 8-16 mm depending on the conveyor design.

Machine Type	Motor Power	Capacity (t/h)	Dimensions (distance from feeding to discharge point)
PM-BCV500	Depends on the capacity, length and inclination of the machine and product features	Different capacity from 5 t/h until 400 t/h, depending on the product features and customer request.	Different lengths depending on the customer request and the project requirement.
PM-BCV650			
PM-BCV800			
PM-BCV1000			





Vertical and Horizontal Conveying System:

Screw Conveyor

AIM

The aim of this specification is to describe general design parameters and specification of screw conveyor, manufactured by Parget Makina.

GENERAL DESCRIPTION

Screw Conveyor is used for vertical transportation or slightly inclined transportation of bulk materials, often powder or granular. It is designed in required length and capacity depending on the field of use, characteristics of conveyed material, required capacity, conveying distance and inclination.
Rotation of helical screw drives material from inlet point to outlet with fixed or variable speed.

Design parameters of screw conveyor:
Capacity (ton/hour)
Diameter of rotor
Diameter of rotor pipe
Screw pitch and screw thickness
Inclination
Rotation speed
Inputted filling level
Screw Length
Type of conveyed material
Screw conveyor is designed considering foresaid parameters. Suitable motor is
selected according to filling level of 40-45%. Maximum rotation speed is 70 rmp.
However, per customer request it is possible to exceed the rotation speed.

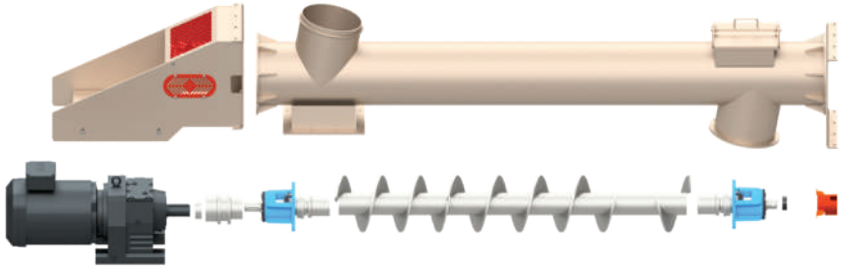
Machine Type	Capacity (m3/h)
PM_SCU250	12
PM_SCU300	23
PM_SCU350	34
PM_SCU400	47
PM_SCU450	70
PM_SCU500	111

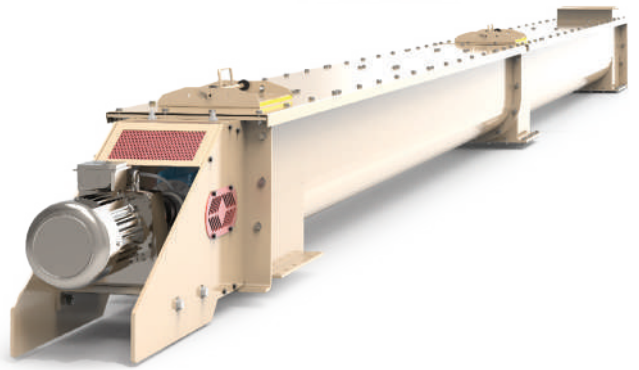
Standard design of screw conveyor can be:

• Tube type (O type): outer pipe is made of seamless drawn steel pipe with front welded-on detachable flanges.
Helical screws with variable pitches are welded to the center pipe (screw inside pipe) and are installed on floating bearings of the drive and end plates. Due to use of floating bearings it is possible to prevent deformation that can occur because of the temperature change. Depending on customers' request, maintenance openings, inlets, outlets and bolt connected cover, ensuring fast material discharge in urgent situations, can be added in different quantity.

• Trough screw (U type): trough, made of bent steel sheet (Hardox, S235JR), is welded and/ or bolt connected with main parts. Helical screws with variable pitches are welded to the center pipe (screw inside pipe) and are installed on bearings of drive and end plates. Due to use of floating bearings it is possible to prevent deformation that can occur because of temperature change. Depending on customer request, maintenance openings, inlets and outlets and bolt connected cover, ensuring fast material discharge in urgent situations, can be added in different quantity.

Additionally, special designs can be provided according to customer requests and different sectors. Depending on characteristics of conveyed materials, screw conveyors can be made completely of S235JR, stainless steel or HARDOX.

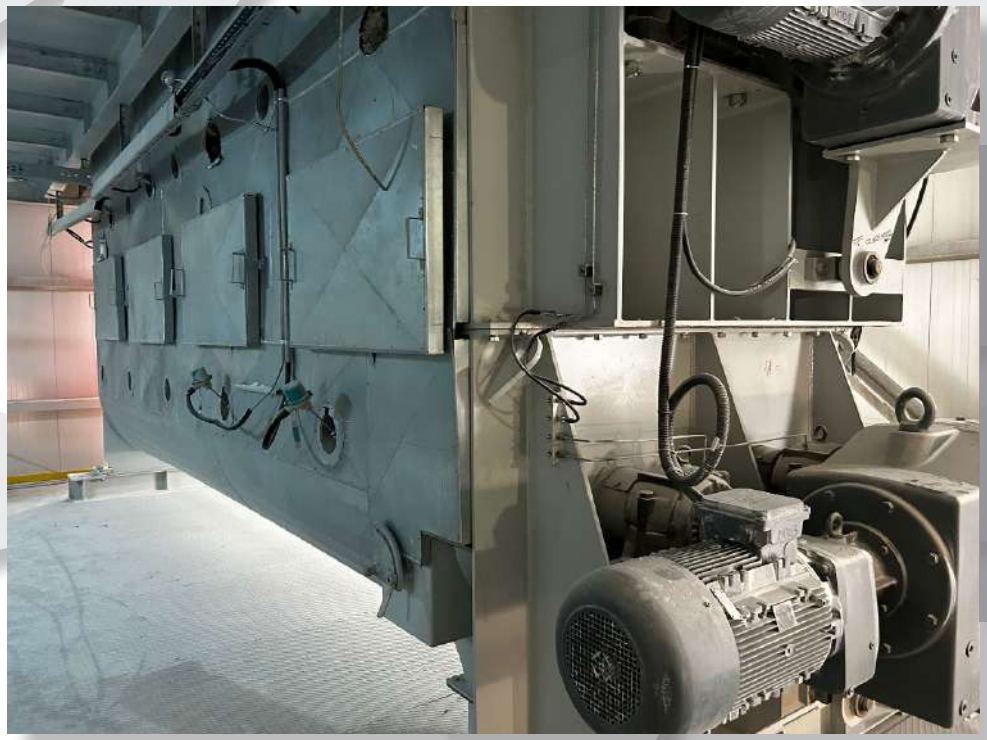




Hydration Unit

Hydrator

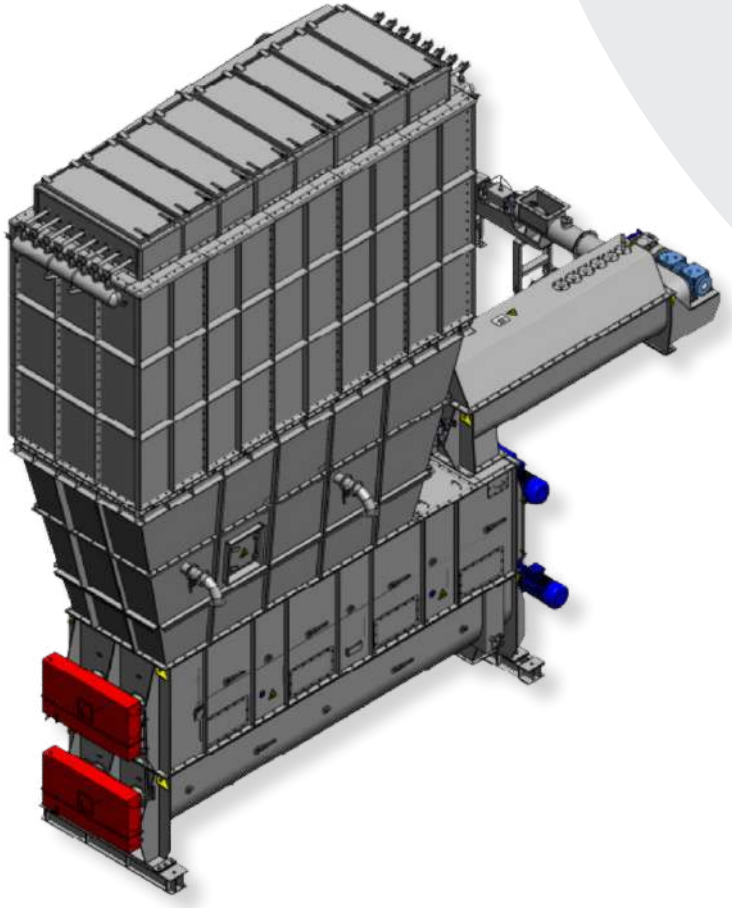
An important and valuable product for our customers is hydrated lime. That is why we offer complete solutions for hydration plants - in a modular and compact design. Designed and engineered by Maerz, manufactured by Parget Makina and complemented by sophisticated engineering for the entire plant with one or two circuits for production rates of 5 t/h, 10 t/h, 15 t/h, 20 t/h, 25 t/h and 30 t/h. this compact design optimises the space requirements of the plants and, thanks to its modular construction, also allows expansions such as the extension to two circuits.



The hydrator uses fine milled lime 0 - 10 mm and water to generate hydrated lime. The chemical formula is: CaO + H2O -> Ca(OH)2 The hydration process is exothermic, that means during the chemical process of lime hydration, temperature is a secondary product and in our plant is used to regulate the amount of water injected in the mixing chamber so that the temperature in the main hydrating chamber to be kept at a set value determined by the process engineer. The first part of the process is the weighing and transportation of the raw material and water in the premixer chamber. From the pre-mixer chamber, the product is reaching the mixing chamber where the bulk of the hydration process takes part. Excess water in the form of vapors and heat are removed using a filter placed on the upper part of the hydrator. The product is transported then to a maturing chamber, where the final part of hydration takes place.

Hydration Unit

Hydrator



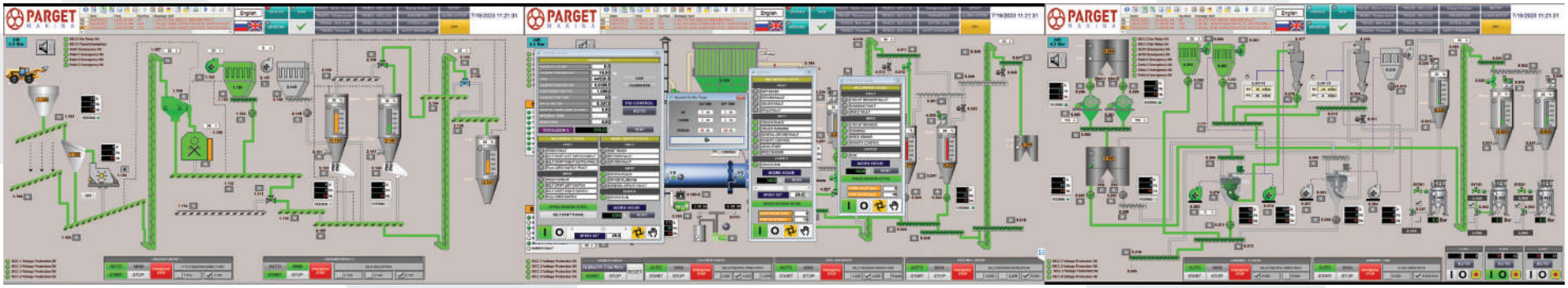
Advantages of Hydrator

- Maerz branded hydrator with best quality.
- Smart design of grinding and classifying systems.
- Guaranteed product quality.
- Possibility to produce different fractions with one single unit
- High level of automation for automatic operation and control

Electric and Automation System

Benefits of our electrical and automation system, PLC&Scada software and computerised operation systems are:

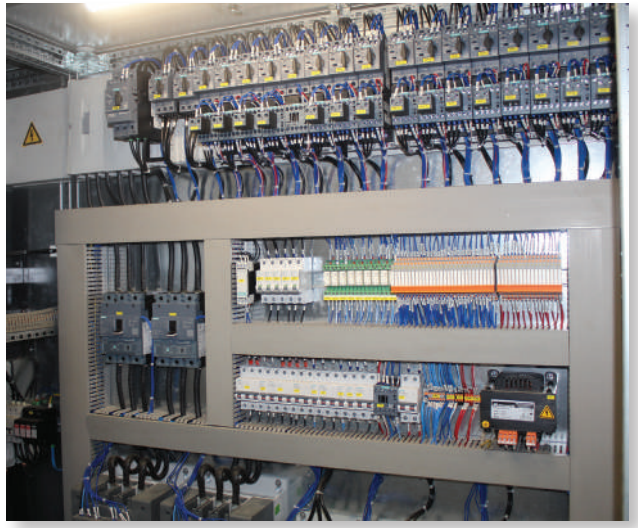
- Flexibility and ease of controllability
- Low human force cost due to full automation
- Decrease of human factor effect and production cost due to smart software
- Uninterrupted and high quality production facilities;
- Possibility to monitor and control all stages of procces and production
- All electrical and automation system based on updated technology
- Data collection and analysis, reporting, fast communication, formulation and archiving with high capacity via SCADA and PLC software
- Possibility of remote access to the system and maintenance service for automation system
- Usage of universal standart types and models in order to give to the Customer independed acces to spare part availibility



Electric and Automation System

SCOPE OF SUPPLY FOR ELECTRICAL AND AUTOMATION SYSTEM:

- Parget makina is providing the electrical and automation system by working together with the most experienced companies in this sector
- Parget makina provides complete electrical automation systems for the plants including PLC&MCC switch cabinets, local distribution cabinets, field instruments, plc&scada software, computerised operation system, cable and cable trays and other parts of electrical system basing on customer request
- The brands of components used in electrical automation system are the most well known, experienced, ease of supply european brands such as Siemens, Schneider, Danfoss, Telemechanique, Eaton, Leuze, Vega, Endress Hauser, Mettler Toledo, Eae, Rittal etc
- Supply of complete package of engineering documentation for electrical and automation system with the software with open codes in order to give to the customer independed operation and future revisions
- Electrical ınstruments that will be used in electrical system will be industrial and heavy duty types



References

References

TOSYALI HOLDİNG

Burnt and Grinded Production Plant	600 t/day

Guri SH.P.K

Hydrated Lime Production Plant	20 t/hour
Calcined Lime Production Plant	250 t/day

OYAK ÇİMENTO

Hydrated Lime Production Plant	25 t/hour
Burnt and Grinded Production Plant	400 t/day

Mineral Technologies

Hydrated Lime Production Plant	10 t/hour
Calcined Lime Production Plant	250 t/day

KÇS KİPAŞ ÇİMENTO

Hydrated Lime Production Plant	25 t/hour
Burnt and Grinded Production Plant	600 t/day

Metanat A

Hydrated Lime Production Plant	10 t/hour
Burnt and Grinded Production Plant	150 t/day

AL NAMARIQ MINING

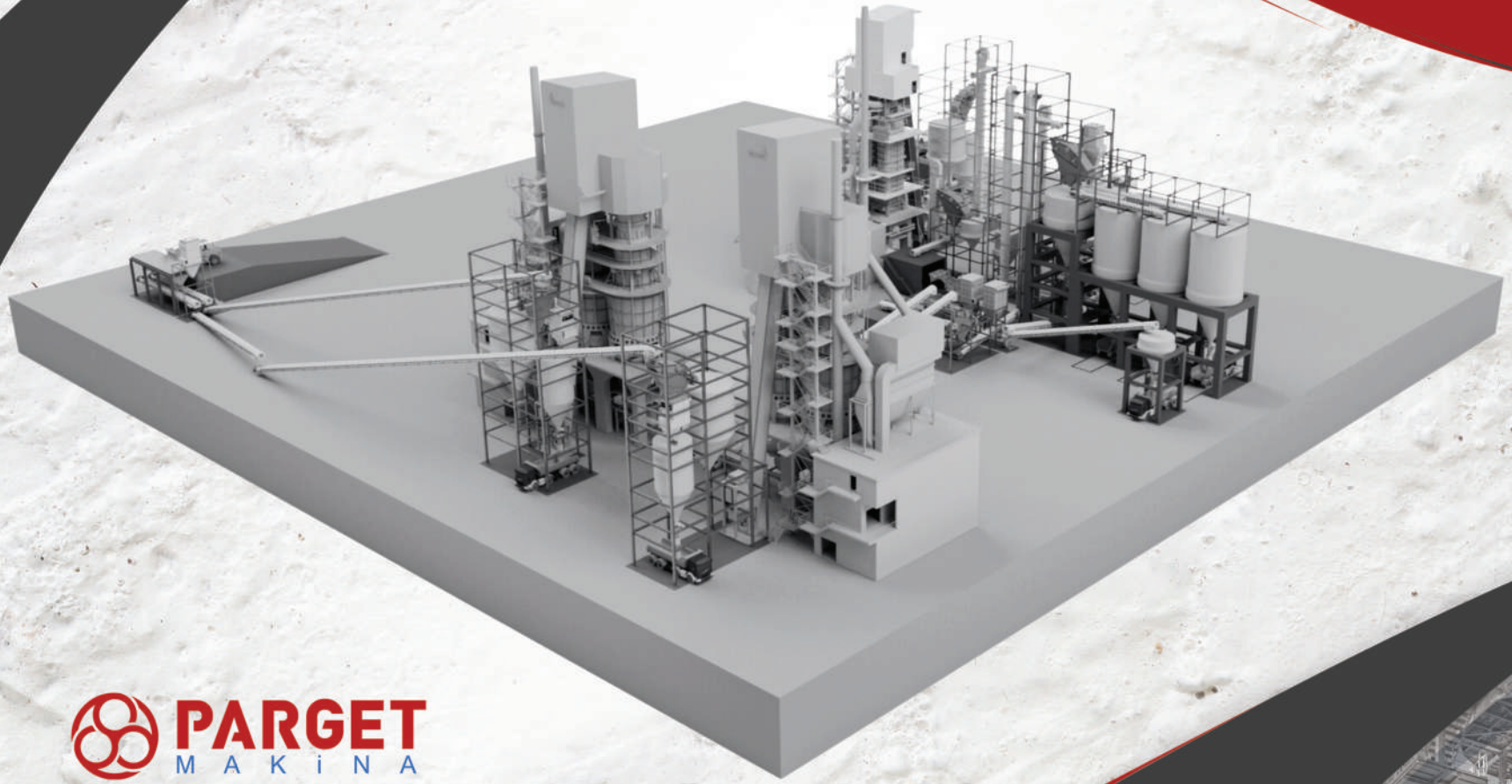
Burnt Lime Production Plant	300 t/day

SF BALAKOVO

Burnt Lime Production Plant	220 t/day

AESW

Burnt Lime Production Plant	120-160 t/day



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Susuz Mahallesi 3789 Cad. No:12/1
06105 Yenimahalle Ankara / Turkiye
info@parget.com.tr
www.parget.com.tr