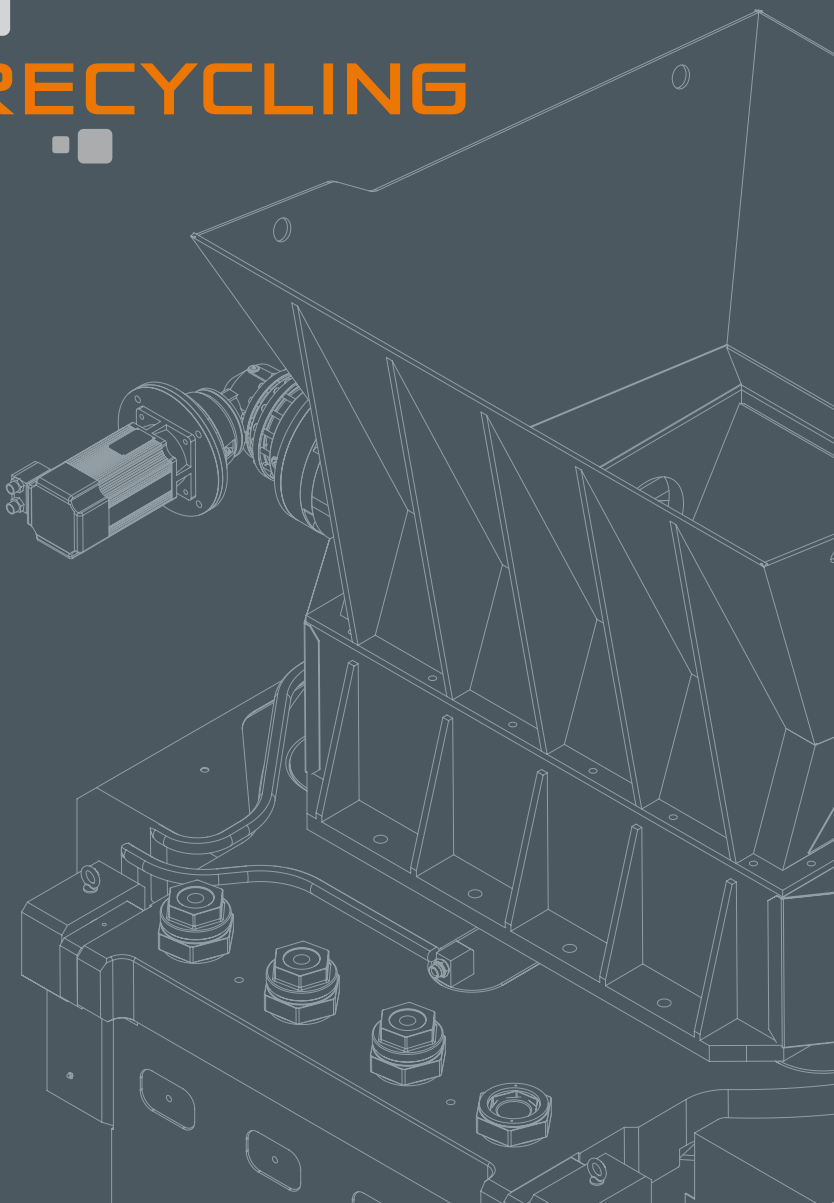
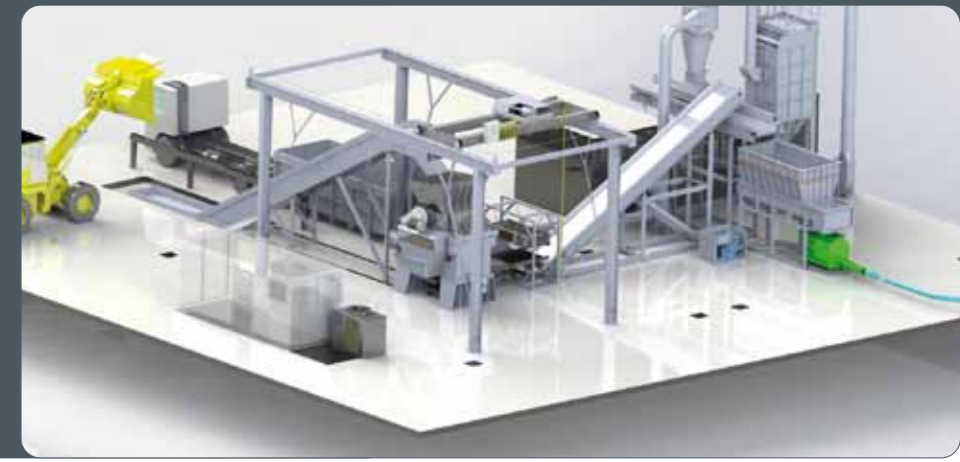




TP primary shredder, HELYOS granulator and MP refiners

TYRES RECYCLING





One partner for *ELTs* recycling

Since 1995, Molinari has been producing refining mills to reduce rubber chips from 0 to 4mm. To complete the range of our products, we have designed two completely new machines: the primary shredder TP and Helyos, the granulator with vertical axis.

TP is a robust and powerful primary shredder which permits the rapid shredding of car tires and truck tires with a homogeneous output result, without the use of other machines.

The unique design of the revolutionary granulator Helyos, allows to separate the wire of the tire, producing rubber chips of various sizes, in accordance to the client's needs.

After the separation of the wire, the rubber and the textile pass to the refining phase. This is a stage where Molinari Refiners are very well known for their reliability and production. The size of the granules is reduced below 4mm.

By working with experienced partners, we can offer complete systems for the separation of the textile or, if the output is used as AF, the dosing and feeding system for the calciner.



Turn-key plants: from *whole tyre* to *granules*



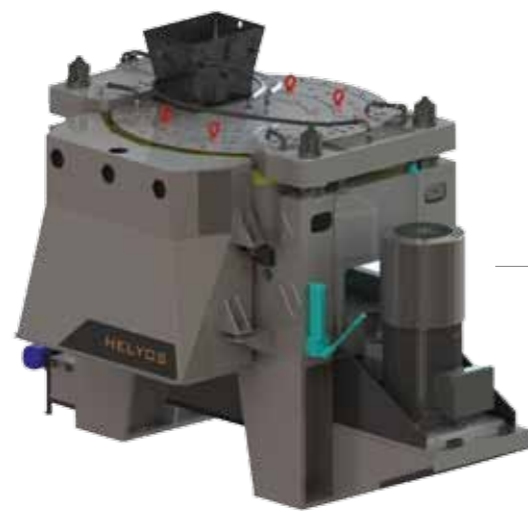
END LIFE TYRES

SHREDDING PHASE
TP SERIES



SHREDS

GRANULATION PHASE
HELYOS

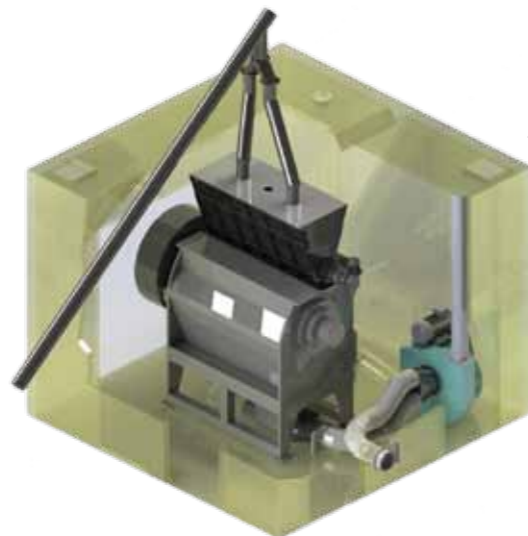


STEEL



RUBBER + TEXTILE CHIPS

REFINING PHASE
MP SERIES

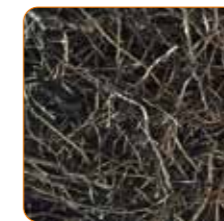


GRANULES

1. Primary shredding by TP
2. Granulation by Helyos - vertical axis shredder
3. Unloading of the product onto a vibrant table, and separation of the steel by magnetic overbelt
4. Transport to the stocking area or to the next phase of steel cleaning (Helyos Fe)
5. Refining with the MP Series mills
6. Textile separation
7. Classification phase according to the client's needs
8. Stocking phase in big-bag.

Steel valorization

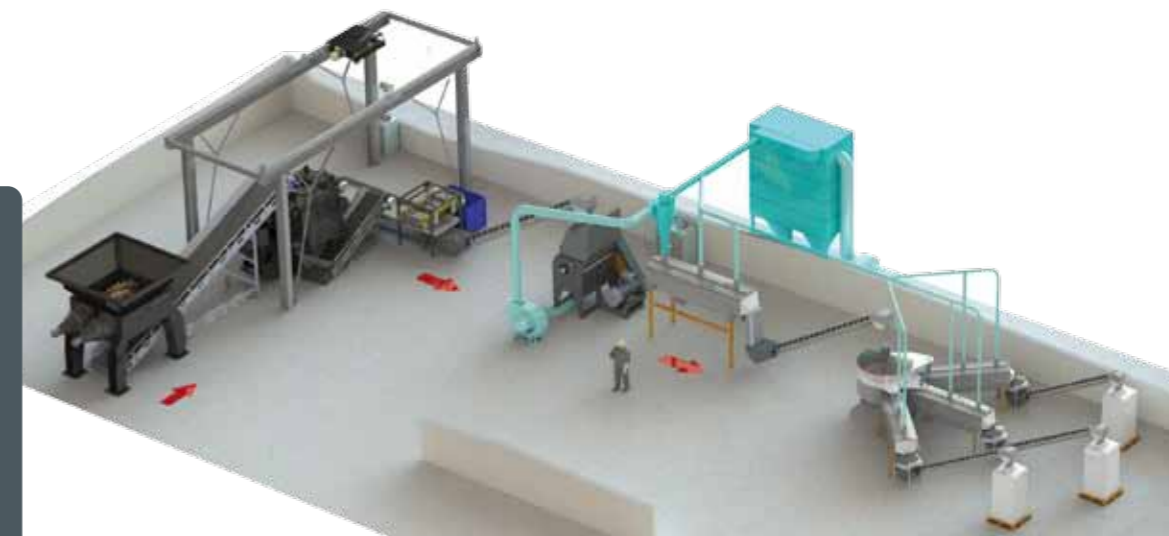
The ferrous fraction removed can be treated with a further Molinari machine, that clean it from the residual gummy component (<3%), thus allowing an important exploitation of the harmonic steel.



CLEAN STEEL

Secondary raw material

Example of shredding plant from whole tyres to granules





TP SERIES ELTs primary shredders

The machines of TP Series are perfect for the volume reduction of ELTs and the production of alternative fuels.

The machines of TP Series are the first that make a recovery of used tyres.

They can treat either car and truck tires up to 120 cm diameter, and some types of industrial and agricultural tires.

Low-speed rotation is the winning feature of this shredders.

They consist of two rotors with opposite rotation, independent of each other. The cut is possible thanks to the action of the rotating blades on fixed blades installed on a traverse between the two rotors.

The machines can be equipped with a screen, which allows to obtain a product of defined dimensions, suitable for use as TDF.

The rotating blades and the fixed blades are interchangeable and can be sharpened.

Technical features

- Robust thick steel frame
- High structural rigidity
- Low speed of shredding
- Two independent shafts
- Double rotor to avoid clogging phenomena
- Blades in alloy steel interchangeable and sharpenable
- Rotors with blade-holders made of hardened and cemented material
- Adjustable fixed blades
- Central traverse can be lowered for maintenance
- Adjustable speed of every rotor



Track tyres SMALL shreds



Shredding Chamber

It consists of a strong structure that holds two rotors with opposed rotation.

The rotors are independent of one another and can perform inversions. The rotating blades are arranged in a staggered design, they are interchangeable and resharpenable.



Traverse

Fixed blades are installed on a central traverse, which is adjustable and in a few minutes allows to set the distance between the rotating blades and fixed blades, thus ensuring an always well defined cutting for a quality TDF.



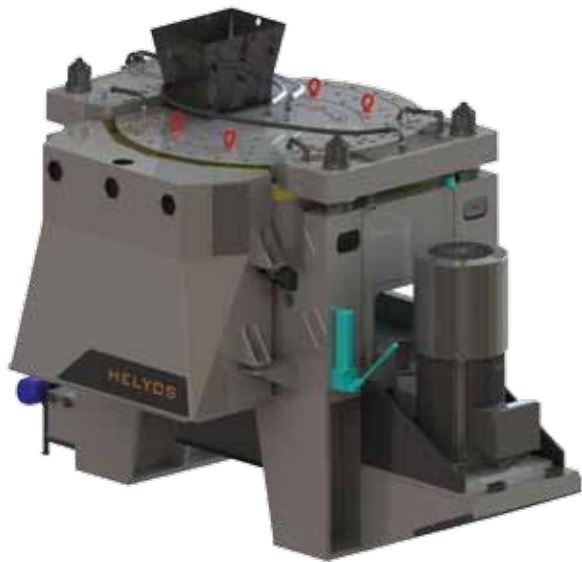
Screen

The final size of the shreds can be calibrated according to the production requirements of the Client. With four screens installed under the rotors, you can get a product suitable for use as an alternative fuel (Small, Medium or Large), or make a simple reduction in volume.



Drive

The drive is via hydraulic motors.



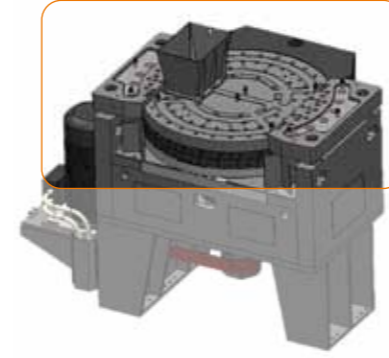
Helyos ELTs granulator

Helyos is the perfect machine for granules and alternative fuel steel-free. It is a granulator having a vertical axis with opposing cutting planes. This technology makes it possible to easily separate the steel contained in tires. The principle of operation is unique in the field of ELT recovery, in fact enables the shreds to be quickly expelled from the grinding chamber, avoiding overheating. Harmonic steel liberated from rubber can be removed by a magnetic separator.

Helyos allows to adjust the grain size of the output, according to the needs of the customer market.

The possibility of easy adjustment of the rotors allows to obtain 40 x 40 mm chips suitable for use as an alternative fuel, or a 15 mm granules for rubber recovery as a secondary raw material.

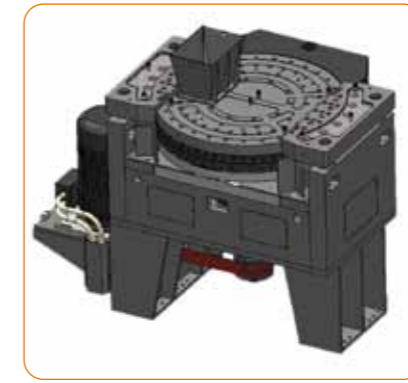
In both cases, the steel that is released from the rubber can be economically enhanced.



Stator and Rotor

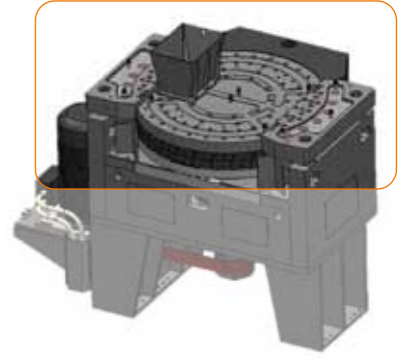
Two discs with a diameter of 2400 mm which mount radially arranged blades. Cutting planes are mutually opposite and act performing a shears cut.

The material is introduced through an opening located on the upper part of the stator. The rotation speed of the rotor is 43 rpm. The centrifugal force given by the rotation of the rotor allows to dump the material from the outer edge of the discs.



Body

Robust structure in carpentry, very thick welded, machined in Italy with CNC machines. Possibility to add water during the shredding to break down the dispersion of the textile-dust in the environment.



Cooling

Special probes send the temperature data of the machine directly to the PLC, in order to alert the operator in the event of abnormal overheating. The optimum temperature of the machine is maintained through the cooling liquid of the stator, rotor and bearings.

Strong Points

- Exploitation of wire liberated from shreds
- Steel-free chips, suitable for AF and SRM
- Low temperature of the output
- Low energy consumption

Technical features

- Thick electrowelded structure, machined in Italy
- Vertical axis flywheel with special cutting angle blades
- Vertical axis stator with blades regulating system
- Automatic lubrication Interchangeable and sharpenable blades
- Soft-start start-up
- Touch-screen control panel with operation data reading

One technology for maximum gain

Granulometry setting

Helyos allow to calibrate the output size according to production needs of the customer: a granule from 0 to 15 mm for the recovery of rubber as a secondary raw material, or various



Big chips up to 40 mm for AF use



20 x 20 mm truck chips for AF use



0-15 mm granules for MPS

chip sized up to 40x40 mm for use as alternative fuel.

Whatever is the final size, steel is released from the rubber to be enhanced.

The permanence of the material in the grinding chamber is given by blocks placed on the outer edge of

the rotor and stator: the closer they are, the more the material remains in the machine.

The blocks can be adjusted by acting on the screw that holds them fixed to the machine.



MP2200R: ELT rubber refiners

The Molinari Mill is highly popular in the market for its durability, ease of maintenance and excellent performance in the refining of rubber chips.

The whole range of refiners dedicated to ELTs recycling is arranged for the cooling of the fixed blades, the bearing supports and the rear conveyor. The patented rotor with staggered blades achieves excellent performance in terms of productivity and low energy consumption.

The characteristics of the Molinari rotor with staggered blades make it the only machine able to reduce energy costs.

The lowering of the screen-holder system by means of an hydraulic cylinder enables a rapid and safe control of the grinding chamber. It is possible to work with screens with holes of a diameter of 3, 4, 5 mm or over.

The blades made of high-alloy special steel can be sharpened up to 6 times before replacement.

Hollow rotor: up to 30% energy saving

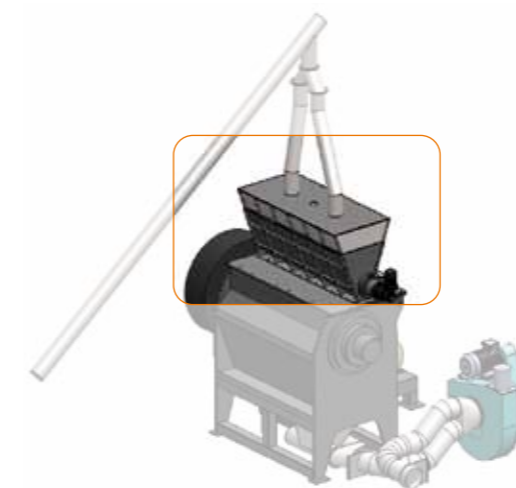
Hollow rotor with staggered blades, patented by Molinari. It provides energy savings up to 30%, with a given production.

Interchangeable and sharpenable blades. Fixed blades are axially adjustable and can be sharpened.



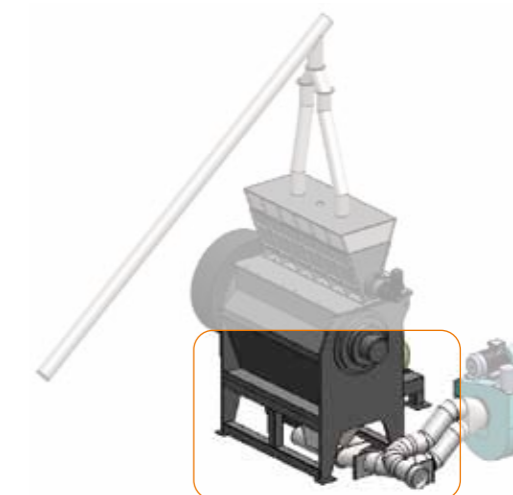
Technical features

- Thick electrowelded structure
- Hollow rotor with staggered blades, with constant profile of the diameter
- Highly alloyed steel blades, which can be sharpened
- Rotary blades of the model MP2200 R2 can be used 4 times before sharpening
- Axially adjustable fixed blades
- Hydraulic cylinder to open the screen holder
- Bets transmission
- Arrangement for water cooling of bearing supports, blades, and rear conveyor



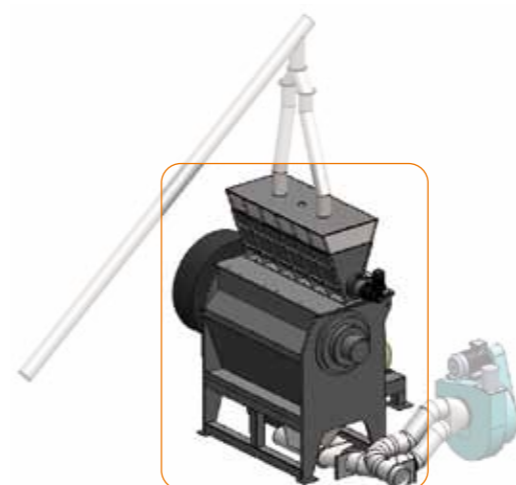
■ Loading hopper

Loading hopper suitable for loading by conveyor belt or by a distributing screw (designed by Molinari).



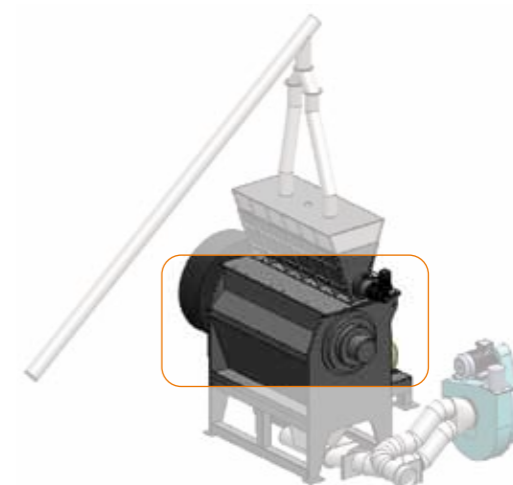
■ Unloading hopper

Discharge hopper suitable for pneumatic transport.



■ Structure

Strong and thick structure machined in Italy with CNC machines. Large flywheel to increase the linearity during the operation.



■ Cooling

Arranged for water cooling of bearingsholders, fixed blades, back side of the body.



Tech rubber - diam. 25 mm screen



Granules from screen diam. 5 mm



Granules from screen diam. 3 mm



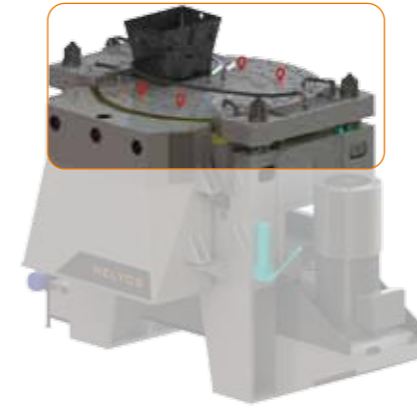
Helyos Fe: Wire cleaner

Helyos Fe is a cleaner for steel that is extracted from end life tires. Its compact design allows you to add it also in existing plants.

It is a vertical-axis machine and the heart consists of two discs with opposing planes where the blades are radially installed. The material is introduced from above through an opening on the stator disc.

The radial arrangement of the blades and the rotation speed of the rotor, make the material introduced between the two discs to be ejected laterally, passing through the blades that remove, by rubbing, the rubber residues from steel wires.

The output is a mixture of rubber granules, textile and clean steel. An effective magnetic-system allows to separate the steel part from other materials. If necessary, the same machine can be used also as a granulator for shreds.



Stator and Rotor

Two discs with a diameter of 2000 mm which mount radially arranged blades. Cutting planes are mutually opposite and act performing a shears cut.

The material is introduced through an opening located on the upper part of the stator. The rotation speed of the rotor is 43 rpm. The centrifugal force given by the rotation of the rotor allows to dump the material from the outer edge of the discs.



Cooling

Special probes send the temperature data of the machine directly to the PLC, in order to alert the operator in the event of abnormal overheating.

The optimum temperature of the machine is maintained through the cooling liquid of the stator, rotor and bearings.



Body

Robust structure in carpentry, very thick welded, machined in Italy with CNC machines. Possibility to add water during the shredding.

Technical features

- Thick electrowelded structure, machined in Italy
- Vertical axis flywheel with special cutting angle blades
- Vertical axis stator with blades regulating system
- Automatic lubrication
- Interchangeable and sharpenable blades
- Soft-start start-up
- Touch-screen control panel with operation data reading

*Increased profitability
thanks to
the steel exploitation*



Input



Steel from end life tyres

Output



Steel, rubber and textile



TP Series - primary shredders

Adjustable speed from 5 to 10 rpm

Two shafts, independent rotation, adjustable speed of every rotor

Thick electrowelded structure, machined in Italy

Highly alloyed steel blades, which can be sharpened

Fixed blades adjustable

Output size adjustable

	TP2000	TP2500	TP3500
Rotor length (mm)	2000	2500	3500
Rotor diameter (mm)	860	860	860
Dimensions (mm)	5000 x 3300 x h3800	6800 x 4200 x h3800	7400 x 3300 x h3800
Fixed blades (n°)	10	26	17
Rotary blades (n°)	90	120	180
Power (kW)	150-360	200-400	250-500
Weight (ton)	40	52	65



Helyos - rubber granulator / steel cleaner

Low speed

Output size adjustable

Thick electrowelded structure, machined in Italy

Highly alloyed steel blades, which can be sharpened

Low energy consumption

	HELYOS 2000	HELYOS FE
Diameter (mm)	2000	2000
Blades (n°)	133	133
Dimensions (mm)	4000 x 3800 x h4500	3000 x 2000 x h3000
Speed (rpm)	43	43
Power (kW)	200	132
Weight (ton)	30	28



MP Series - refiner

Arranged for cooling

Output size adjustable

Thick electrowelded structure, machined in Italy

Highly alloyed steel blades, which can be sharpened

Belt transmission

	MP1600R	MP2200R
Rotor diameter (mm)	650	850
Rotor length (mm)	1600	2200
Dimension (mm)	2500 x 2600 x h4000	3200 x 3000 x h4500
Power (kW)	132	250
Weight (ton)	8.5	16



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