

our nanotech future

Complete Tyre Recycling

End of Life Tyre Shredding/Granulation System

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June 2009**

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End of Life Tyre Shredding/Granulation System

Large quantities of end of life tyres are currently available within all over the world.

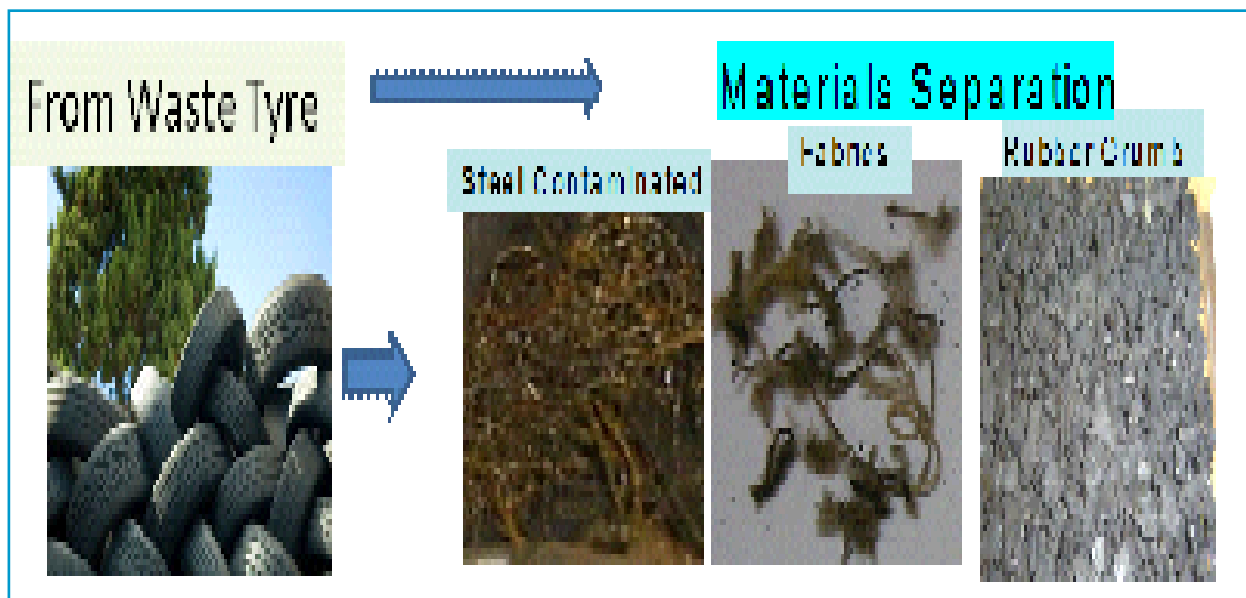
Waste tyres present an enormous environmental problem, at present approximately 180 million scrap tyres are produced each year in the European Union, and 150 million in the US alone with an estimated stockpile of 3000 million tyres awaiting disposal. This same problem is present to a greater or lesser extent in most countries.

This provides an excellent business opportunity by guarantying a profitable income which can be generated by selling both recovered materials as well as the finish products manufactured from the material available from the recycled tyres. Such products include -

- Different sizes of Granulated & Crumb rubbers
- Sale of the recovered steel (approx; one tonne of steel costs around USD 160/tonne)
- Textile materials - can be used to make thermal insulators and other base products).

Shredding and Granulation System:

We are offering a complete reconditioned shredding and granulating system to produce various crumbing sizes. The system can shred and granulated tyres taken from both cars and trucks. The system can also remove all the steel and textile from the tyre leaving behind the rubber in different sizes.



System Parameters

Nominal Capacity	3 - 4 ton/hr.
Input Product	Used Tyres
Basic Ratio	70% Car Tyres / 30% Truck Tyres
Maximum Tyre Diameter	1,600mm
Maximum Tyre Weight	85kg/ tyre
Typical Tyre Composition (based on the ratio above)	
Rubber	65% Approx.
Textiles (Fibre)	20% Approx.
Steel	15% Approx.

Please Note: The parameters quoted are approximate values based on experience and may vary depending on the input product composition. Deviation of the input product may lead to modification of the system design, throughput capacity and cost.

Technical Specifications and Description of Plant Functions

- **Primary-Conveyor Belt (Heavy Duty)**

A steel slat type conveyor belt is provided for loading the tyres from ground level into the primary shredder.

Power	7.5kW through heavy duty reduction gearbox
Belt Width	1.8 Meters
Belt Length	10 Meters
Belt Type	Steel Slat with full width cleats
Support Stand	Fabricated steel section
Tensioning	Adjustable bearing blocks top and bottom



- **Primary Shredding System (Heavy Duty Twin Shaft)**

A twin shaft primary shredder is provided to pre-shred the tyres into smaller pieces.

The shredder blades are located on large, heavy duty hexagonal shafts to suit the heavy duty, high torque shredding operation.

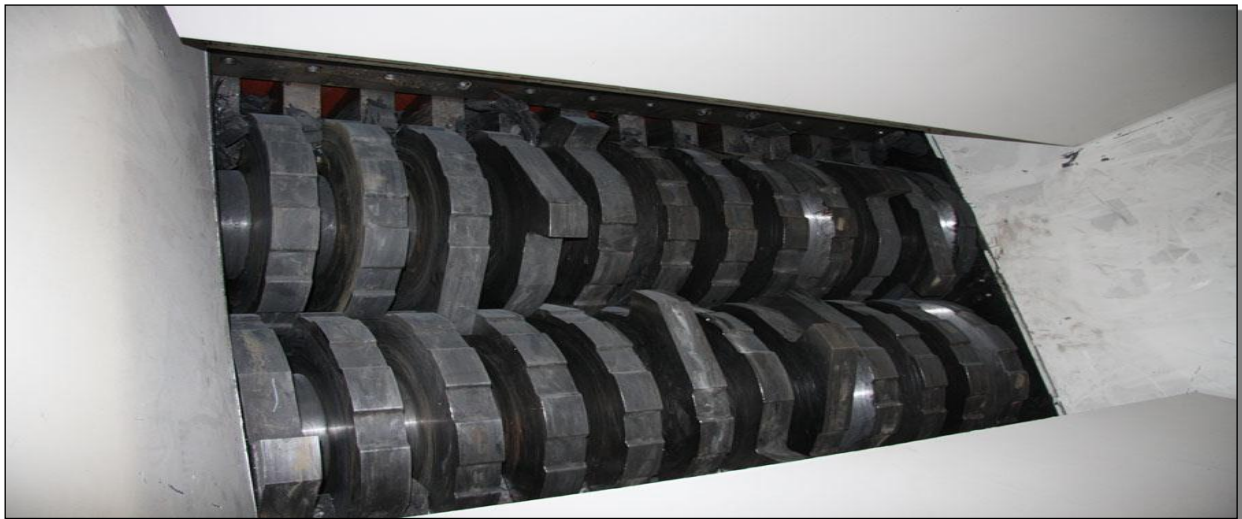
The power from the drive units is transmitted to the shafts through heavy duty couplings. This allows the gearboxes and motors to remain in place if the shaft or shredding chamber is removed for maintenance.

The unique split shredding chamber design allows the shafts to be removed from above which facilitates quick and easy blade changes.

A hydraulic pusher is fitted to the shredder to force the tyres into the shredding knives and hold them onto the blades until they are processed. The pusher prevents the tyres from riding on the blades and considerably increases performance.

Technical Specification;

Power	100 kW
gearbox Type	Heavy Duty Planetary (1 per Shaft)
Rotor Length	1.8 Meter
Chamber Size	1.808 Meter Long x 1.510 Meter Wide
Rotor Diameter	260mm (Hexagon) with Blade Diameter 756mm
Blade Type	Grade 4140, Serrated edge design especially for tyres
No of Blades	24pcs @ 75mm Thick
Product Size	150mm wide x 200-400mm long
Support Stand	Fabricated steel section with access platform and adders
Hydraulic Power	5.5kW



- **Discharge Conveyor Belt (Heavy Duty)**

A steel slat type conveyor belt is provided for conveying the pre-shredded tyres from primary shredder discharge area into the 2nd shredder.

Power	7.5kW through heavy duty reduction gearbox
Belt Width	1.25 Meter
Belt Length	10. Meter

Belt Type	Steel Slat with full width cleats
Support Stand	Fabricated steel section
Tensioning & Alignment	Adjustable bearing blocks top and bottom



- **Secondary Shredding System (Heavy Duty Twin Shaft)**

The Secondary Shredder receives the pre-shredded tyres from the primary shredder and further shreds them to a smaller more uniform chip size. The specification of this machine is identical to that of the primary shredder except this machine has no hydraulic pusher and the blades are a different thickness.

Power	2 x 55kW (1 per shaft)
Gearbox Type	Heavy Duty Planetary (1 per Shaft)
Rotor Length	1.8 Meter
Chamber Size	1.808 Meter Long x 1.510 Meter Wide

Rotor Diameter:	260mm (Hexagon)
Blade Diameter:	756mm
Blade Type:	Grade 4140, Serrated edge design especially for tyres
No of Blades:	32pcs @ 50mm Thick
Product Size:	150mm wide x 200-400mm long.
Support Stand	Fabricated steel section with access platform & ladders

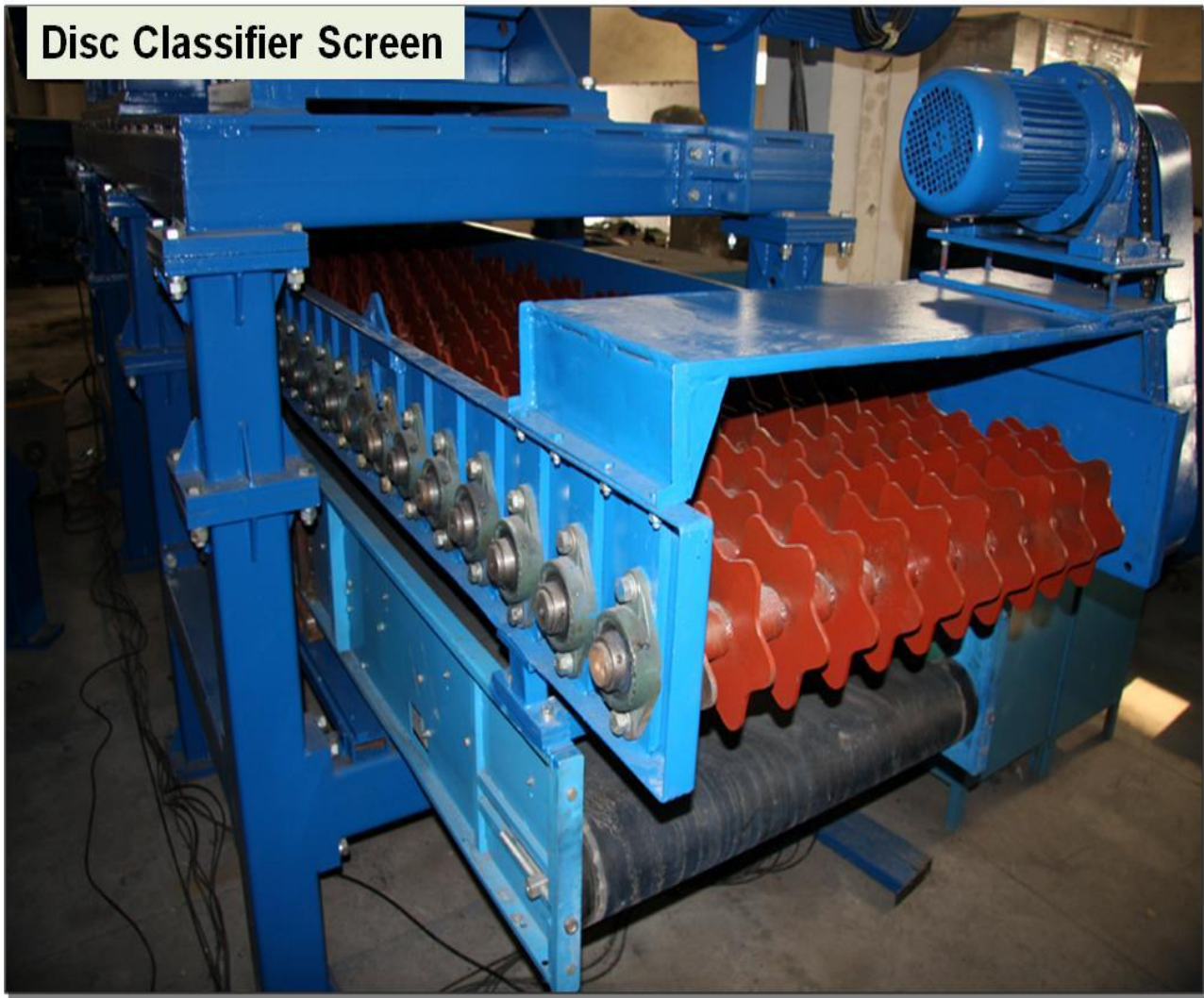
- **Secondary Shredding**
- **System (Heavy Duty Twin Shaft)**



- **Disc Classifier Screen**

The shredded tyres from the secondary shredder fall onto a Disc Classifier Screen which sorts the shredded rubber by size. The screen is configured to allow an 80mm² chip to pass through to the next process. The oversize material remains on the screen and is carried to a recirculation conveyor for further shredding. This ensures that the shredded material is the optimum size for processing in the 2nd shredding system.

Power	5.5kW
Classifier Width	1.10 Meter
Classifier Length	5.0 Meter
Support Stand	Fabricated steel section
Balancing	Movable counterweights



- **Horizontal Chip Conveyor Belt**

The sized rubber chip from the Disc Classifier Screen is transferred from beneath the Secondary Shredder by the Horizontal Chip Conveyor Belt and is delivered onto the Inclined Chip Conveyor Belt.

Power	5.5kW through heavy duty reduction gearbox
Belt Width	1.0 Meter
Belt Length	3.50 Meter

Belt Type	Heavy duty rubber
Support Stand	Fabricated steel section
Tensioning & Alignment	Adjustable bearing blocks either end

- **Recirculation Conveyor Belt**

Oversize shredded material from the Disc Classifier Screen is transported back to the primary shredder by a belt conveyor for further processing.

Power	2.2kW through heavy duty reduction gearbox
Belt Width	600mm
Belt Length	8,500mm
Belt Type	Heavy duty rubber with full width cleats
Support Stand	Fabricated steel section
Tensioning & Alignment	Adjustable bearing blocks either end

- **Inclined Chip Conveyor Belt**

The sized rubber chip (80mm²) from the classifier screen is conveyed to the Rasper by an inclined conveyor belt.

Power:	2.2 kW through heavy duty reduction gearbox
Belt Width:	1.0 Meter
Belt Length:	13.0 Meter
Belt Type:	Heavy duty rubber with full width cleats
Support Stand:	Fabricated steel section
Tensioning & Alignment:	Adjustable bearing blocks either end



- **Granulator (Wire Separator)**

The (80mm²) rubber chips are fed into a Granulator which further reduces them to the size of 12-15mm rubber crumb, liberating the tyre wire and some of the fibre from the rubber in the process.

The split chamber design provides easy access to the blades. The upper part of the chamber opens on a hydraulic strut to facilitate easy maintenance. If required the rotor shaft can be removed from above by simply unbolting the bearing housings and uncoupling the shaft from the gearbox.

The product size produced is determined by a classifier screen mounted beneath the rotor in the cutting chamber. The screen retains the material in the cutting chamber until it has been cut small enough to pass through the holes.

Power:	315 kW
Transmission:	Fluid Coupling & 18:1 Reduction Gearbox
Rotor Diameter:	660mm

Rotor Width:	1.60 Meter
Shaft Speed:	86 RPM
Chamber Size:	1.606 Meter Long x 0.782 Meter Wide
Chamber Opening:	Hydraulic with integrated hydraulic power pack
Blade Configuration:	Zig-Zag
Blade Material:	D2
Screen Size:	~20mm (TBC)
Support Stand:	Fabricated steel section with access platform & ladders

Granulator





- **Discharge Conveyor Belt**

A belt conveyor is mounted beneath the Rasper to transport the crumb from the discharge area, under a Magnetic Separator to the next process.

Power	1.1kW through heavy duty reduction gearbox
Belt Width	1.30 Meter
Belt Length	4.0 Meter
Belt Type	Heavy duty rubber
Support Stand	Fabricated steel section with stainless section for magnet fitment
Tensioning & Alignment	Adjustable pulleys at either end

Discharge Conveyor Belt



- **Cross Belt Magnetic Separator**

A cross belt permanent Magnetic Separator is mounted above the Rasper Discharge Conveyor Belt to remove the tyre steel from the rubber. The ferrous material is delivered into collection bins beside the separator.

Power	1.5kW through chain and sprocket arrangement
Belt Width	0.510 Meter
Belt Length	1.60 Meter
Belt Type	Heavy duty rubber
Magnet Type	Rare Earth High Intensity
Support Stand	Fabricated steel section, adjustable magnet height setting.
Tensioning & Alignment	Adjustable pulleys at either end

Cross Belt Magnetic Separator



- **Rubber Conveyor Belt**

The steel free rubber granules containing fibre are conveyed from the Rasper discharge belt onto a vibratory screen by a Rubber Conveyor Belt.

Power	1.1kW through heavy duty reduction gearbox
Belt Width	0.800 Meter
Belt Length	3.000 Meter
Belt Type	Heavy duty rubber
Support Stand	Fabricated steel section
Tensioning & Alignment	Adjustable pulleys at either end

- **Vibratory Separator**

The rubber and liberated fibre is delivered onto a vibratory separator. The separator screens a percentage of textile and fibre from the rubber crumb. Fluff stays on top of the screen and is drawn off by a pair of suction covers. The fines pass through the screen and are blown to the second vibratory separator mounted after the granulators. The rubber crumb travels further along the screen and falls into a Horizontal Screw Conveyor.

Power	2 x 1.5kW vibratory motors
Screen Width	1.200 Meter
Length	4.000 Meter
Support Stand	Fabricated steel section



- **Granulator Feed Screw Conveyor**

The rubber chips from the vibratory separator are dropped into a twin scroll Granulator Feed Screw Conveyor. The conveyor splits the material stream and delivers it into three different screw conveyors.

Power	4 kw
Transmission	Speed Reducer / Chain & Sprocket
Screw Length	3.000 Meter
Screw Diameter	0.30 Meter

No of Outlets	3
Control Method	Adjustable Gate
Support Stand	Fabricated steel section

Granulator Feed Screw Conveyor



- **Three-Inclined Screw Conveyors**

The rubber chips from the granulator feed screw conveyor are conveyed to the Granulator feed openings by three Inclined Screw Conveyors.

Power	4 kw
Transmission	Speed Reducer / Chain & Sprocket
Screw Length	5.000 Meter
Screw Diameter	0.400 Meter
Support Stand	Fabricated steel section



**Inclined Screw
Conveyors (3 off)**

- **Three- Granulators of Rubber**

Three Rubber Granulators is design to process 12-15mm² rubber chips which are fed into three Granulators which reduce them further to a 2-6mm rubber crumb, liberating the fibre from the rubber in the process.

The split shredding chamber design provides easy access to the blades. The upper part of the chamber opens on a hydraulic strut to facilitate easy maintenance. If required the rotor shaft can be removed from above by simply unbolting the bearing housings and removing the drive belts.

The product size produced is determined by a classifier screen mounted beneath the rotor in the cutting chamber. The screen retains the material in the cutting chamber until it has been cut small enough to pass through the holes.

Using a screen with a hole diameter of 5mm will ensure that the fibre has been liberated from the rubber, if a 6mm screen is used there will be 3-5% fibre in the finished rubber product.

The screens are a consumable item and can be changed quickly and easily when required.

Power	90 kW each
Transmission	V-belt drive arrangement
Rotor Diameter	0.520 Meter
Rotor Width	1.200 Meter
Shaft Speed	462 RPM

Chamber Size	1.200 Meter Long x 0.720 Meter Wide
Chamber Opening	Hydraulic with integrated 1.1kW hydraulic power pack.
Blade Configuration	Chevron (Vee) Cut
Blade Material	D2
Screen Size	6mm (TBC)
Support Stand	Fabricated steel section with access platform & ladders.



- **Vibratory Separators (3 off)**

The granulated rubber from each granulator falls directly onto a vibratory separator. The fibre which remains on the top of the screening deck is sucked off and blown to a collection cyclone. The rubber crumb that passes through the screen is classified into two products. The size granules fall into a blower and are conveyed to the Zig-Zag Separators. The oversize granules fall into a blower and are conveyed back to the granulators for further processing.

Power	2 x 1.5 kW vibratory motors
Screen Width	1.0 Meter
Length	3.000 Meter
Support Stand	Fabricated steel section

Three Vibratory Separators



Six - High Pressure Product Blowers

A High pressure electric blower transports the sized rubber granules and remaining textile to the Zig-Zag classifiers. The oversize rubber granules fall into a separate blower and are conveyed back to the granulator feed hopper. Each classifier is fitted with two blowers.

Power:	7.5 kW Direct Drive
Ducting:	127mm (5") Stainless Steel

Three - Zig-Zag Separators

The sized rubber crumb from each granulator is conveyed through a cyclone and rotary to a set of three Zig-Zag Separators (1 per granulator). As the material tumbles down through the separator an upward stream of air carries away the remaining fibre to the fibre collection hopper. The heavier rubber crumb falls to the bottom into a roller magnet.

Power	1.1 kW Rotary Valve Unit
Control	Variable suction through inverter drive
Ducting	127mm (5") Stainless Steel



- **Three - Roller Magnets**

The rubber granules that pass through the bottom of the Zig-Zag Separators fall onto a permanent rare earth magnetic roller. Any fine wire or ferrous metals in the rubber stick to the roller and are removed to a collection bin. The rubber falls off the roller into a blower.

Power	0.55 kW
Drum Width	0.400 Meter
Drum Diameter	0.325 Meter



Three - Roller Magnets

- **Three-High Pressure Product Blowers**

High pressure electric blowers transport the rubber crumb from the roller magnet discharge up to the rubber crumb collecting hoppers.

Power	7.5 kW Direct Drive
Ducting	0.127 Meter (5") Stainless Steel

- **Three-Rubber Crumb Collecting Hoppers**

The crumb rubber is collected in three storage hoppers before being distributed into collection bins or bulk storage bags.

Capacity	1000L
Support Stand	Fabricated steel section

- **Two - Dust Removal Systems**

Two dust removal systems are provided. One system is for the Rasper, and one for the Rubber Granulators.

Power	11 kW
Capacity	1000L
Support Stand	Fabricated steel section



- **Water Cooling System**

A water cooling system is supplied for circulating water through the granulators which is cooled by means of a plate cooler.

Cooling Capacity	0-80T
Circulation Pump	4kW

- **Paint Specification**

Equipment would be primed and painted Dena Blue as requested. Stainless steel parts will remain self-coloured.

- **Electrical Control Panel**

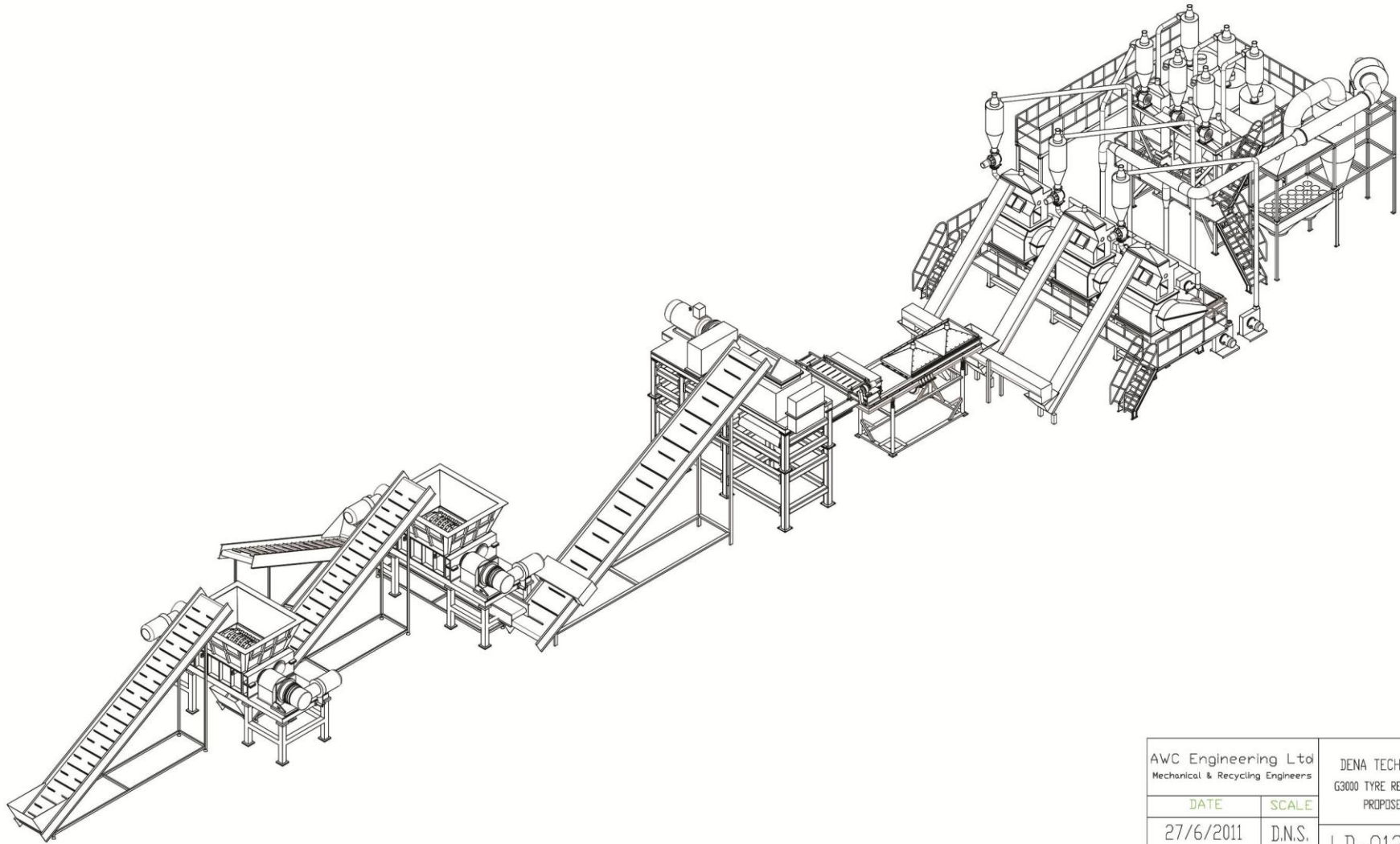
A common electrical control panel is supplied for controlling all functions of the tyre recycling system. We only use electrical components from reputable manufacturers such as Schneider, Telemecanique and PLC controllers from Siemens.

An emergency stop safety circuit will be provided with stop buttons at various locations around the plant.

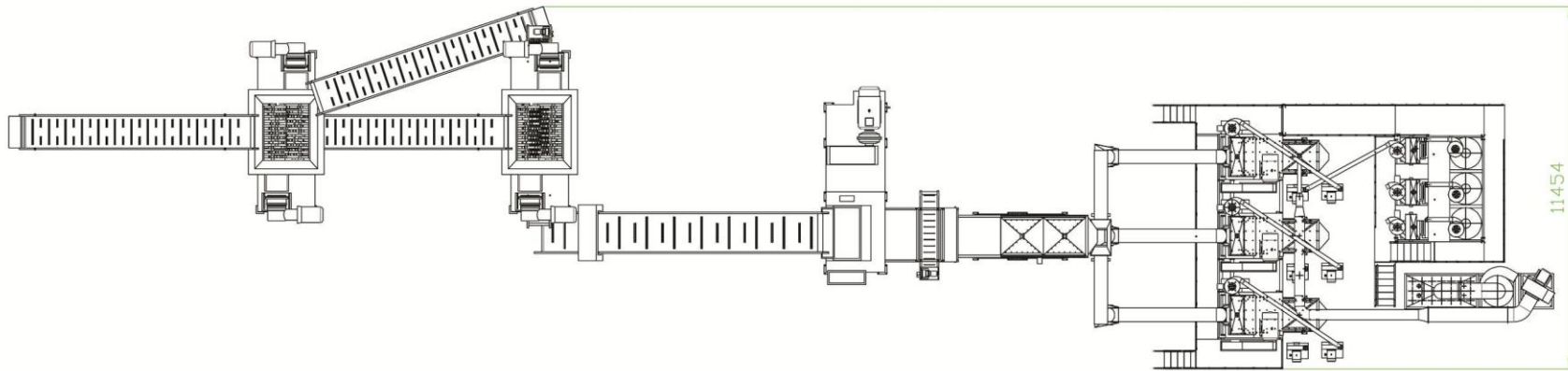
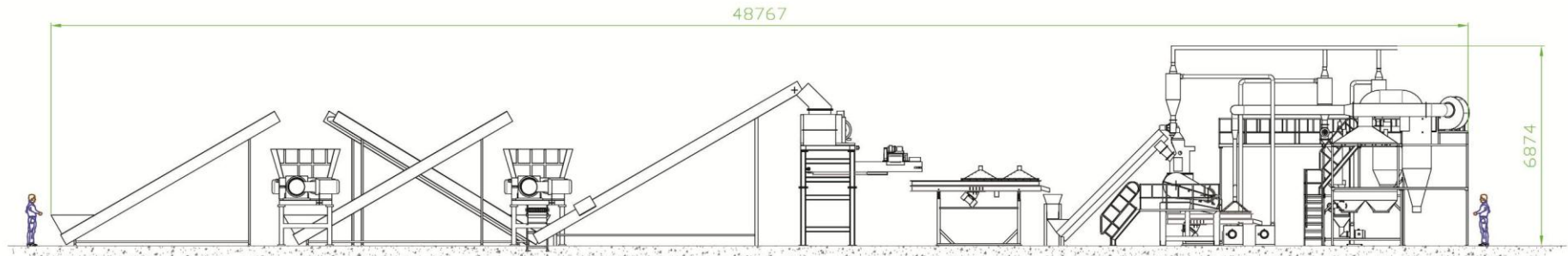
All of the electrical switch gears are contained in sealed steel, IP rated electrical enclosure.



Proposed Layout Drawing



AWC Engineering Ltd Mechanical & Recycling Engineers		DENA TECHNOLOGY LTD. G3000 TYRE RECYCLING SYSTEM PROPOSED LAYOUT 3D	
DATE	SCALE		
27/6/2011	D.N.S.		
DRAWN BY J. W. DAKIN		LD-Q1273A-3D	



AWC Engineering Ltd
Mechanical & Recycling Engineers

DATE	SCALE
27/6/2011	D.N.S.
DRAWN BY J. W. DAKIN	

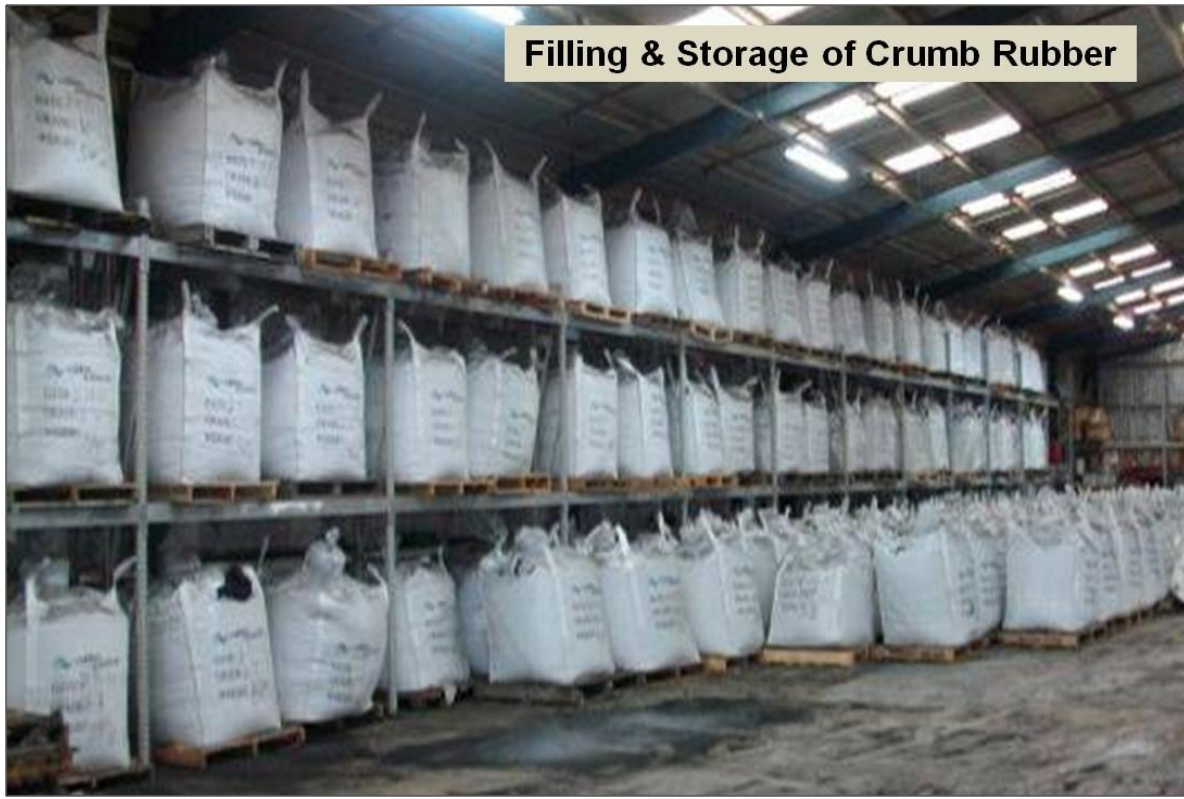
DENA TECHNOLOGY LTD.
G3000 TYRE RECYCLING SYSTEM
PROPOSED LAYOUT

LD-Q1273

Primary & Secondary Shredding Systems







Price: - End of Life Tyre Shredding/Granulation System

Available on Request

We Do Joint Venture

Benefits of Joint Venture

- We provide all the technical assistance after sales. So you don't have to worry about any issues regarding hardware and technical issues
- We will sell your entire finished product from the day one. So that you don't have to worry about selling the finished products

Delivery

Ex-works our manufacturing plant approximately 6 months from date of order acceptance and down payment and confirmation of technical details.

Warranty & Service

12 Months or 2000 hours from commissioning parts warranty.

Excluding consumable items i.e. knives, screens & lubricants. Our team of experienced engineers is available for technical assistance.

Installation & Commissioning: 10% of total value of order

Validity of Quotation: 30 days from date of Quotation

Packaging, Transport & Insurance: To be quoted prior to despatch

Packaging, Transport & Insurance: To be quoted prior to