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SCANDINAVIAN ENVIRO SYSTEMS

TYRE RECYCLING

HIGH QUALITY **CARBON BLACK** FROM TYRES

14 000 000 TONS OF END-OF-LIFE TYRES ARE ACCUMULATED ANNUALLY IN THE WORLD AND ARE TODAY ONE OF THE WORST GLOBAL SOLID WASTE PROBLEMS.

A GLOBAL PROBLEM

Until now, used tyres have been added to the billions that have been stockpiled or buried in landfills. There are as well a significant number of unaccounted tyres found in illegal dump sites and warehouses around the world.

Tyres are difficult and expensive to recycle due to their complex structure and today most end-of-life tyres are incinerated or used as landfill. These methods have significant limitations and are not sustainable solutions.

Granulation is today a common technology to recycle tyres, but the products made from granulted tyres have a limited market and also need to be recycled when they are worn out.

In the manufactureing of virgin carbon black, up to two tons of oil is burnt to produce one ton of carbon black.

Recycling carbon black means re-using the precious material and in addition, the process has significantly lower CO_2 footprint compared to traditional manufacturing of virgin carbon black.

THE SOLUTION

At Scandinavian Enviro Systems, we consider the end-of-life tyres to be a valuable resource. We regard the recycling of the components to be the ultimate solution to the tyre waste management problem. This is both sustainable and environmentally friendly.

THE REVOLUTIONARY CFC PROCESS

The patented CFC process (Carbonize by Forced Convection) from Scandinavian Enviro Systems enables a safe, efficient and environmentally friendly technology for recycling of tyres.

The CFC process produces high quality recycled carbon black, oil, steel and gas. The closed CFC process also has low environmental impact and has high return of investment.

SES is a member of Artis Sustainable Materials Group – an initiative that brings key players within the rubber industry, such as investors, end users, materials producers and recyclers, together to look at the use of sustainable materials in rubber products.

THE COMPANY

In 1998 the first patent was issued and three years later, the company **Scandinavian Enviro Systems** (SES) was founded. Today, the company holds three patents in several countries that protects the process at a global scale.

The inventor of the CFC technology, Bengt Sture Ershag, has been developing the CFC technology for more than 20 years. His mission has been to find a way to recycle tyres in a profitable and environmentally friendly way.

SES has since 2007 built five pilot plants to verify the process and the products in cooperation with the swedish rubber industry.

Since 2012, a full scale tyre recycling plant is operated by SES' subsidiary **Tyre Recycling in Sweden AB**. The plant is located in Mellerud, Sweden and produces EnviroCB™ from tyres.

EnviroCB™, is beeing used at **Volvo Cars** and **Alvenius** among others where it is replacing 100% of the virgin carbon black in their rubber products.

A TURN KEY TYRE RECYCLING PLANT FROM SES ->

YOUR TYRE RECYCLING PLANT SUPPLIER

SES is ready to become your cooperative partner and to provide you with a profitable solution to your tyre waste management problem.

SES' scope of supply can be anything from the key equipment that have an impact of the carbon black quality to a turn-key plant including siteworks and building.

PRODUCT YIELD

THE YIELD FROM THE PLANT IS FOUR PRODUCTS IN THE FOLLOWING APPROXIMATE* FRACTIONS:

*The distribution varies depending on what tyre raw material is used in the process.

33% EnviroCB™

The carbon black obtained typically comprises around 33 percent of a batch. After pyrolysis there are several post-processing steps where the steel and textile are separated from the carbon black to produce EnviroCB™.

EnviroCB™ is an excellent choice for specific tyre and rubber applications, replacing virgin carbon black with up to 100%.

CUSTOMER APPLICATIONS INCLUDE

CHASSIS PLUGS
- Volvo Cars

ROOFING MEMBRANE

SEALS AND GASKETS
- Alvenius

TYRES

ENVIRONMENTAL ADVANTAGE

Significally less CO_2 emmissions compared to virgin carbon black production

CARBON BLACK MARKET

- Turnover: US$ 25 billion
- Grows 4% per year
- EnviroCB™ has a competitive price and is less depending on oil price fluctuations.

46% BioOil*

The oil produced in the CFC process comprises around 46 per cent of a batch. Three different fractions of oil are produced from the CFC plant.

HEAVY OIL - with a high flashpoint

LIGHT OIL and

ULTRA LIGHT OIL

The oil has a high enegy value and can sold as fuel for industrial combustion. Yet, it is possible to refine the oil for use as a chemichal feedstock at a refinery.

The ultra light oil and a fraction of the light oil are used as a fuel in the process and this makes the process self-sustainable regarding heat energy.

USE IN INDUSTRIAL ENGINES

The latest tests indicates that we are meeting the specifications from global producers of industrial engines after separation of suspended solids and water content.

An engine and generator can be supplied by SES.

10% BioGas*

The gas produced in the plant is compressed and stored in a gas tank. The same gas in used as a fuel for the gas burners in the process and hence the gas serves as an energy source for the plant. Thogether with a fraction of the oil it makes the plant self-sufficient in heat energy.

The excess energy from the process is recovered and can be used in various applications as hot water.

*The tests were conducted by the independent laboratory Beta Analytic in Miami and verify up to 48% bio content in oil produced with our standard tyre mix and up to 79% using mining tyres.

11% Steel

The scrap steel from the tyres is of high quality and can be sold to local smelteries and foundries.

The wires can be sold as it is or be compressed to bales depending on local marked requirements

PLANT DESIGN

MODULAR SYSTEM

The plant is divided into several parts and has a modular design where the production capacity can be scaled to whatever size that fits the customer. SES can supply equipment in the range from a complete turn key plant to the essential components and together with the customer find the best investment solution.

PRE PROCESS

- TYRE UNLOADING
- SCHREDDING (OPTIONAL)
- TYRE FEEDER SYSTEM

CFC PROCESS

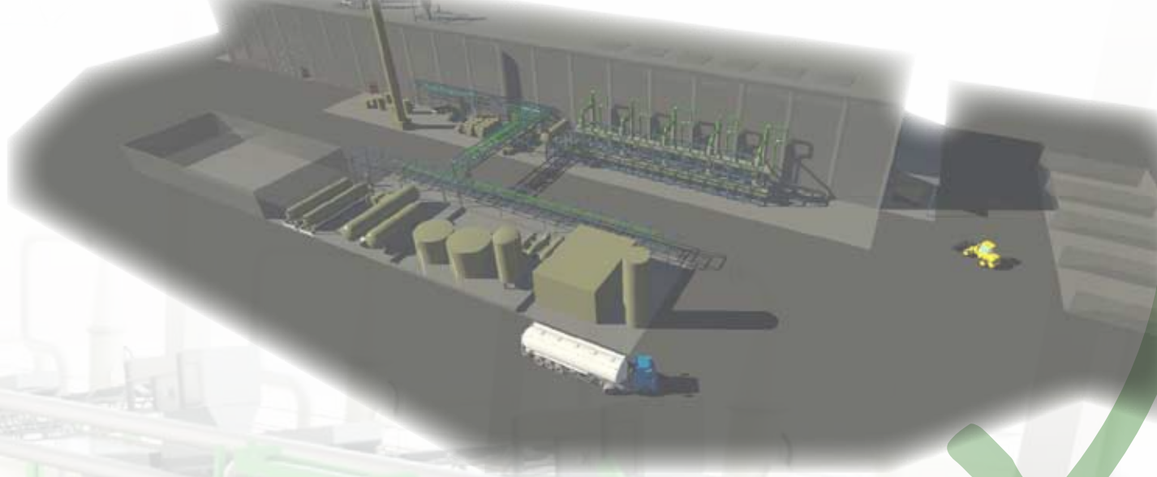
- FURNACE
- HEATER
- REACTOR
- CONDENSOR
- BLOWER

POST PROCESS

- DISCHARE
- SEPARATION
- MILLING
- GRANULATION
- PACKAGING

UTILITIES

- ELECTRICAL SWITCHGEAR
- DCS & CONTROL ROOM
- OIL AND GAS HANDLING
- AIR & NITROGEN



FOOTPRINT

PROCESS BUILDING

The main building that holds the main process and post process for a typical plant with capacity 30 000 tons of tyre per year uses about 4000 m^2 with a ceiling height of approximately 15 m. This area includes also a separate big bag storage room for 400 bags.

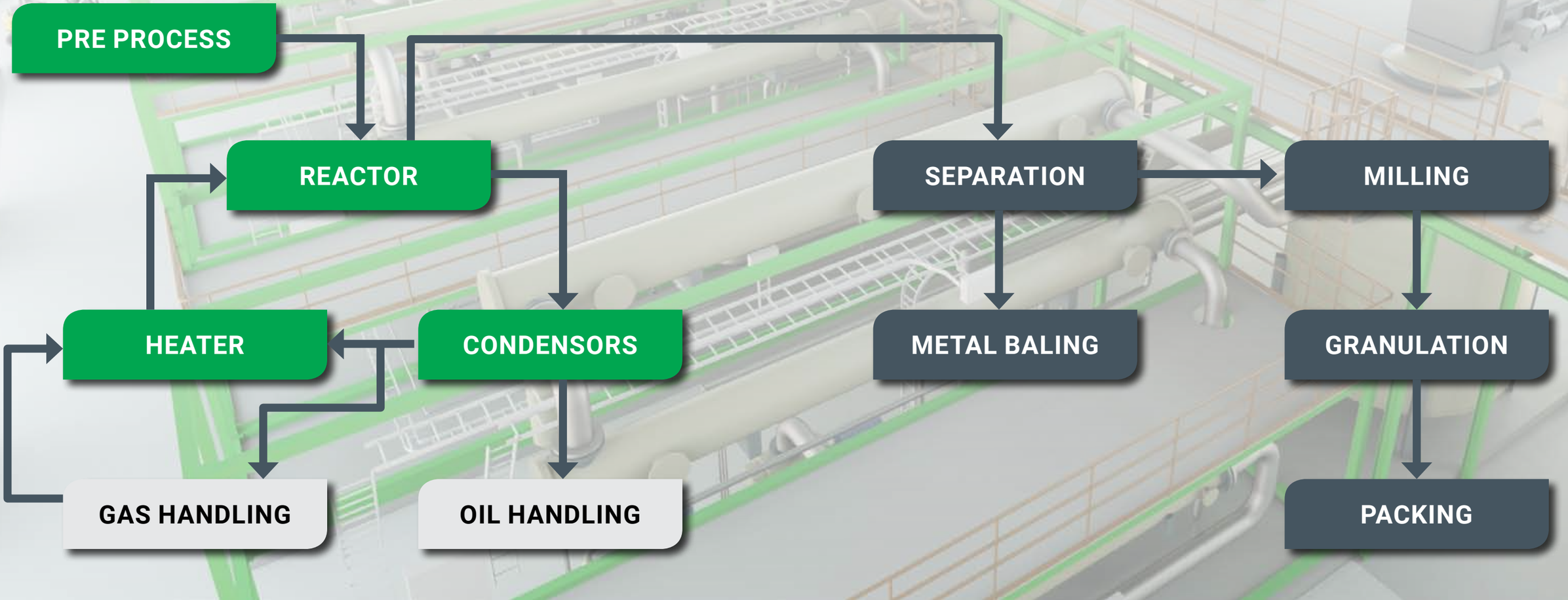
SURROUNDINGS

TYRE STORAGE

OFFICE BUILDING

WORSHOP& GARAGE

OIL AND GAS HANDLING



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THE TEAM

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